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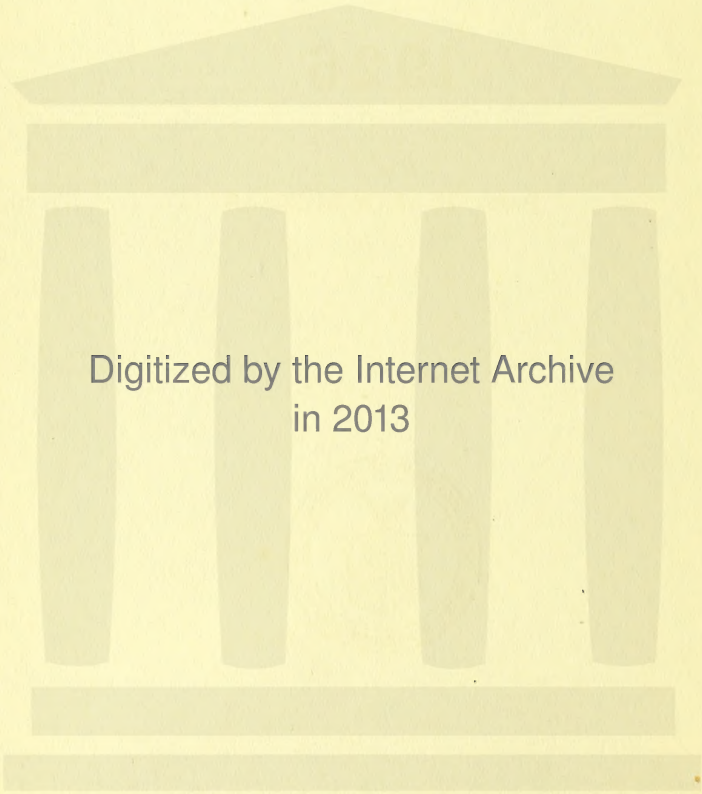
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DEPARTMENT OF COMMERCE
BUREAU OF MINES

MINERAL RESOURCES
OF THE
UNITED STATES
1926

PART II—NONMETALS

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FUEL BRIQUETS

By F. G. Tryon [1]

PRODUCTION

A sharp increase in both quantity and value of product marked the manufacture of fuel briquets in 1926. This infant among the mineral industries of the United States now supplies nearly a million tons of excellent household fuel that has a value at the producers' plants of eight and a half million dollars. In comparison with 1925, the production of 995,332 net tons in 1926 represents an increase of 19 per cent; in comparison with 1923, the increase is 43 per cent.

The largest single cause of the increase was undoubtedly the shortage of anthracite, due to the great strike of the anthracite miners, which began September 1, 1925, and was not settled until February 12, 1926. During this period the only supplies of anthracite available were such stocks as had been accumulated by the producers and retailers—sufficient at the most for only a few weeks' consumption—plus a small quantity of the steam sizes dredged from the rivers. Even for weeks after the resumption of mining, the quantity of the domestic sizes available was unequal to the requirements. The shortage of anthracite increased the demand for other forms of household fuel, among which briquets hold a favored place.

Fuel briquets produced in the United States, 1925-26

	1925		1926	
	Net tons	Value	Net tons	Value
Eastern States	253,643	$1,842,257	288,884	$2,110,932
Central States	422,411	3,684,095	575,130	5,093,062
Pacific Coast States	163,316	1,602,052	131,318	1,329,185
	839,370	7,128,404	995,332	8,533,179

The strike thus served to introduce briquets to some thousands of consumers who had not tried them before, but it is clear that the growth of the briquetting industry does not rest alone on such interruptions in the supply of anthracite. The production has been

[1] The tables on domestic production in this report were prepared by Miss J. M. Corse, of the Bureau of Mines, who has compiled the statistics on fuel briquets since 1911. Data on imports and exports were compiled by J. A. Dorsey from records of the Bureau of Foreign and Domestic Commerce, and those on world's production by Miss L. M. Jones, also of the Bureau of Mines.

growing since 1907, when the first statistical survey showed a total of only 66,524 tons. The periodic shortages of fresh-mined anthracite have merely served to stimulate what would otherwise have been a fairly steady increase. That the briquetting industry is likely to hold much of the ground gained in 1926 is shown by the fact that the largest output in the year was reached in November and December by which time the anthracite shortage had been entirely overcome.

In 1926 the Central States showed the greatest increase in production of briquets—the output was 575,130 tons, or 36 per cent more than that for 1925. The Eastern States reported an increase of 14 per cent. On the other hand, the Pacific Coast States, which were not touched by the anthracite strike, showed a decrease of 20 per cent.

Wisconsin continued to be the largest producer, furnishing about half the total for the country. Pennsylvania ranked second, Washington third, and Virginia fourth.

Fuel briquets produced in the United States, 1907–1926 [1]

Year	Net tons	Value	Year	Net tons	Value
1907	66, 524	$258, 426	1917	406, 856	$2, 233, 888
1908	90, 358	323, 057	1918	477, 235	3, 212, 793
1909	139, 661	452, 697	1919	295, 734	2, 301, 054
1910	[2]	[2]	1920	567, 192	4, 623, 831
1911	218, 443	808, 721	1921	398, 949	3, 632, 301
1912	220, 064	952, 261	1922	619, 425	5, 444, 926
1913	181, 859	1, 007, 327	1923	696, 810	5, 898, 698
1914	250, 635	1, 154, 678	1924	580, 470	4, 986, 622
1915	221, 537	1, 035, 716	1925	839, 370	7, 128, 404
1916	295, 155	1, 445, 662	1926	995, 332	8, 533, 179

[1] Figures for earlier years not available. [2] No canvass for 1910.

MONTHLY PRODUCTION IN 1926

The seasonal character of househeating makes the production of briquets also highly seasonal. In the late spring and summer many of the plants shut down. As production must necessarily precede consumption by a period long enough to allow for transportation, wholesale marketing, and delivery to consumer, the period of maximum activity is in the late autumn and early winter, and by January production normally begins to decline. In 1926 production reached the minimum—31,943 tons—in May, and the maximum—140,655 tons—in November.

Monthly production of fuel briquets in the United States in 1926, in net tons

January	125, 721	August	57, 603
February	110, 815	September	80, 066
March	66, 811	October	134, 543
April	35, 281	November	140, 655
May	31, 943	December	138, 147
June	32, 870		
July	40, 877		995, 332

VALUE

The total value of the product in 1926, f. o. b. plant, was $8,533,179, an increase of $1,404,775, or 20 per cent, over the 1925 value. In 10 years the value has increased fourfold.

The average amount received per ton on all the briquets produced in 1926 was $8.57. This figure is of doubtful significance, however, because of the wide differences in the conditions under which briquets are manufactured in different parts of the country. Among the factors influencing the value at any plant the most important are probably the cost of the raw materials and the prices of competing fuels. In general, the value is highest at plants remote from the coal mines.

The trend of prices from year to year is best indicated by the average value in particular localities as shown in the table that follows. The average value for Pennsylvania in 1926 was $6.74, an increase of $0.39 over 1925 and of $0.92 over 1924; the average for the Central States was $8.86 a ton, compared with $8.72 in 1925 and $9 in 1924.

Average value per net ton (f. o. b. plant) of briquets produced in Pennsylvania and in the Central States, 1911–1926

Year	Pennsylvania	Central States	Year	Pennsylvania	Central States
1911	$2.37	$4.34	1919	$4.17	$8.47
1912	2.68	4.47	1920	5.60	9.23
1913	2.65	4.92	1921	6.14	9.28
1914	2.48	4.83	1922	5.93	9.02
1915	2.90	4.26	1923	5.95	9.35
1916	3.83	4.73	1924	5.82	9.00
1917	3.15	6.81	1925	6.35	8.72
1918	4.11	8.17	1926	6.74	8.86

NUMBER OF PLANTS IN OPERATION

The history of briquet manufacture in the United States has been marked by the erection of many small plants that have later been dismantled or abandoned and by the expansion of undertakings that have proved commercially successful. It is interesting to note that there were only eight more plants operating in 1926 than in 1907, the year of the first survey. The 19 plants of 1926, however, produced 15 times as much as the 11 plants of 1907. The tendency toward larger units is indicated by the average output per plant which has risen from 6,048 tons in 1907 to 52,386 in 1926. The largest number of plants active in any one year was 21 in 1911.

Number and average production of briquet plants in operation in the United States, 1907–1926

Year	Plants in operation	Average production per plant (net tons)	Year	Plants in operation	Average production per plant (net tons)
1907	11	6,048	1917	13	31,297
1908	8	11,295	1918	12	39,770
1909	16	8,729	1919	12	24,645
1910	(1)	(1)	1920	15	37,813
1911	21	10,402	1921	15	26,597
1912	19	11,582	1922	14	44,245
1913	17	10,698	1923	14	49,772
1914	16	15,665	1924	12	48,373
1915	15	14,769	1925	17	49,375
1916	15	19,677	1926	19	52,386

[1] No statistical canvass made.

CAPACITY OF PLANTS

In their reports for 1926 the producers of briquets were asked to state "the capacity of the plant in net tons per 8-hour day." The replies to this question are presented in the table that follows. The smallest plant had a capacity of 25 tons and the largest a capacity exceeding 1,000 tons. More than half had a capacity of less than 200 tons, but the largest number in any class fell in the group of from 200 to 500 tons.

As these capacities refer to a period of eight hours, the actual daily output in some of the larger plants that work two or three shifts, especially in the busy season, would be correspondingly greater.

Thus the total capacity of the 19 plants per 8-hour shift was found to be 4,231 tons, the equivalent, assuming 26 working-days, of 110,006 tons per month. Yet by adding together the maximum monthly tonnages reached by each of the 19 plants in 1926 a total of 179,000 tons is obtained. It may therefore be stated that the briquetting plants of the country have a demonstrated capacity, with existing labor force and working conditions, of at least 179,000 tons a month.

Classification of briquet plants, by capacity per 8-hour day in 1926

Capacity	Number of plants
Less than 50 net tons	3
50 and less than 100	5
100 and less than 200	3
200 and less than 500	6
500 and less than 1,000	1
1,000 net tons and over	1
	19

A further conception of the prevailing size of the briquetting works may be obtained by grouping them according to their production in 1926. The table that follows shows that four plants produced less than 2,000 tons during the year, that the greatest number produced between 5,000 and 50,000 tons, and that there were two plants which produced more than 200,000 tons. In view of the fact that the Bureau of Mines classifies a coal mine producing 200,000 tons as a "large" mine, grouping all mines above that limit in "Class I," one can realize that some of the briquetting plants have attained a very considerable size.

Classification of briquet plants, by size of output in 1926

Output	Number of plants
Less than 2,000 net tons	4
2,000 and less than 5,000	1
5,000 and less than 10,000	4
10,000 and less than 25,000	2
25,000 and less than 50,000	4
50,000 and less than 100,000	1
100,000 and less than 200,000	1
200,000 net tons and over	2
	19

RAW FUEL

The raw fuel used in the manufacture of briquets in the United States is some form of slack or fine coal, or other finely divided carbon, low enough in volatile matter to be "smokeless" but in itself unsuited for household use. Not every supply of low-volatile fine coal, however, can be briquetted at a profit. The price of competing fuels in the nearest retail markets largely determines the price of the product. Unless the selling price can absorb all costs involved in delivering the finished briquet in those markets—transportation and merchandising, as well as cost of manufacture—the mere fact that suitable raw fuel is obtainable at low cost will not insure a profit.

This favorable combination of cost factors is not often found at locations in the coal-mining districts, although plants are operating in some coal fields, as, for example, in the Virginia semianthracite field, the Fairmont field of West Virginia, and the State of Washington. The Washington plants, however, are also very close to the cities of Seattle and Tacoma, which furnish a market for the product. Large quantities of fine material suited for briquet manufacture are available at the Pennsylvania anthracite mines, but thus far the attempts to briquet it on the spot have seldom been successful because of the heavy freight charges in shipping the finished briquets to market. In consequence only a very little of the material available has been briquetted. A supply of suitable fines, from the breakage of lump coal in transit, available at some point near a possible market for the finished product, offers more promise of success, because the transportation charges on the briquets will be relatively low. The American briquetting industry appears to be most firmly established in such locations.

A total of 971,135 net tons of raw fuel was used in 1926; 44 per cent of this amount was anthracite and semianthracite, 47 per cent semibituminous and bituminous coal and semicoke, and 9 per cent subbituminous coal and carbon residue from the manufacture of oil gas. The character of raw fuel used by the 19 plants operating in 1926 was as follows:

Classification of briquet plants, by kinds of material used in 1926

Kind of material used	Number of plants
Anthracite fines	7
Semianthracite fines	3
Mixture of anthracite fines and bituminous slack	2
Bituminous or subbituminous slack	2
Semibituminous fines	1
Semicoke	1
Carbon residue from the manufacture of oil gas	3
	19

The raw material used by the Consolidation Coal Products Co. in its plant at Fairmont, W. Va., offers a particularly interesting example of the kind of fuel used in the manufacture of briquets. This plant utilizes a semicoke containing 12 per cent of volatile matter produced by the low-temperature carbonization of bituminous

coal. The resulting briquet has been reported to be an excellent household fuel.

In Europe much of the bituminous coal used in briquet manufacture is washed in order to reduce the percentage of ash in the finished briquet. In the United States Pennsylvania anthracite has commonly been washed either by the colliery operator or by the briquet manufacturer. Other raw fuels in the United States are seldom washed.

Raw fuels used in making briquets in the United States, 1921–1926, in net tons

Fuel	1921	1922	1923	1924	1925	1926
Anthracite culm and fine sizes and semianthracite	190, 964	254, 563	331, 102	224, 539	387, 454	426, 064
Semibituminous and bituminous slack, coke, and semicoke [1]	121, 925	235, 542	225, 508	297, 814	341, 161	456, 546
Subbituminous coal and oil-gas residue	85, 352	123, 339	125, 880	[2] 61, 012	115, 975	88, 525
	398, 241	613, 444	682, 490	583, 365	844, 590	971, 135

[1] Includes no semicoke, 1921 to 1924, and no coke, 1923 to 1926.
[2] Includes no subbituminous coal.

BINDERS

Asphaltic pitch continues to be the binder most often used in the manufacture of briquets in the United States and was employed either alone or in combination by 12 out of the 19 plants active in 1926. Six producers used asphaltic pitch exclusively, two asphaltic pitch and coal-tar pitch, two asphaltic pitch and sulphite pitch, one an asphalt-sulphite liquor emulsion, one a mixture of asphaltic pitch and starch, one low-temperature coal-tar pitch, one sulphite liquor alone, and two patent binders. The three plants briquetting the carbon residue from oil gas required no binder.

The percentage of binder to raw fuel, by weight, ranged from less than 5 to 9 per cent or more. The proportion most commonly used was 7 or 8 per cent.

Classification of briquet plants, by percentage of binder used in 1926

Binder used	Number of plants
Using no binder (carbon residue)	3
Using—	
Less than 5 per cent binder	1
5 and less than 7 per cent	5
7 and less than 9 per cent	6
9 per cent and over	3
Not specified	1
	19

PLANTS OPERATED IN 1926

All plants that operated in 1925 produced briquets in 1926; in addition, two new plants began producing—the Empire Collieries Co., at Pulaski, Va., on March 1, 1926, and the Wilkeson Coal and Coke Co., at Fairfax, Wash., in April. Another new producer, the Salem Briquette Co., at Salem, Mass., has since begun operation but produced no briquets in 1926.

Briquetting plants operated in the United States in 1926

State	Name and address of operator	Location of plant	Date put in operation	Raw fuel used
Eastern States:				
Maryland	Anthracite Fuel Corporation, Eighth St. and Fait Ave., Baltimore, Md.	Baltimore	1925	Anthracite.
New Jersey	Anthracite Manufacturing Co., 520 Brunswick Ave., Trenton, N. J.	Trenton	1918	Do.
Do	Navicoal Corporation, 437 Chestnut St., Philadelphia, Pa.	Perth Amboy	1925	Do.
Pennsylvania	American Briquet Co., 1505 Franklin Bank Building, Philadelphia, Pa.	Lykens	1920	Do.
Do	Anthracite Briquette Co., Sunbury, Pa.	Sunbury	1919	Do.
Do	Lehigh Coal & Navigation Co., 437 Chestnut St., Philadelphia, Pa.	Lansford	1909	Do.
Do	St. Clair Coal Co., 634 Wyoming Ave., Scranton, Pa.	St. Clair	1925	Do.
Virginia	Delparen Anthracite Briquette Co., Parrott, Va.	Parrott	1915	Virginia semianthracite.
Do	Empire Collieries Co., Pulaski, Va.	Pulaski	1926	Do.
Do	Virginia Fuel Corporation, P. O. Box 505, Norfolk, Va.	Portsmouth	1923	Anthracite and bituminous slack.
West Virginia	Consolidation Coal Products Co., 67 Wall St., New York, N. Y.	Fairmont	1925	Semicoke.[1]
Central States:				
Missouri	Standard Briquet Fuel Co., 818 Security Building, St. Louis, Mo.	Kansas City	1909	Arkansas semianthracite.
Wisconsin	Berwind Fuel Co., 122 S. Michigan Ave., Chicago, Ill.	Superior	1912	Semibituminous slack.
Do	Stott Briquet Co., Merchants National Bank Building, St. Paul, Minn.	do	1909	Anthracite fines and bituminous slack.
Pacific Coast States:				
California	San Diego Gas & Electric Corporation, 863 Sixth St., San Diego, Calif.	San Diego	1925	Carbon (petroleum residue).
Do	Los Angeles Gas & Electric Corporation, 810 S. Flower St., Los Angeles, Calif.	Los Angeles	1905	Do.
Oregon	Portland Gas & Coke Co., Gasco Building, Portland, Oreg.	Portland	1913	Do.
Washington	Pacific Coast Coal Co., 612 L. C. Smith Building, Seattle, Wash.	Renton	1914	Coking bituminous slack and free-burning slack.
Do	Wilkeson Coal and Coke Co., Wilkeson, Wash.	Fairfax	1926	Bituminous slack.

[1] The residue of low-temperature carbonization of bituminous coal.

FOREIGN TRADE IN BRIQUETS

In normal years imports of fuel briquets are negligible, but during the shortage of household fuel caused by the anthracite strikes of 1922 and 1925–26 considerable quantities were imported from Europe for consumption at points on the North Atlantic coast. The imports in 1921 had been only 66 tons. In the winter of 1922–23 they jumped to about 55,000 tons of which about 35,000 tons entered in the calendar year 1922 and about 20,000 tons in 1923. In 1924, when anthracite was freely available, the imports dropped to 38 tons. The strike of September 1, 1925, led to the importation of 6,758 tons late in 1925 and 123,593 tons in the first part of 1926. Of the 1926 imports 14,910 tons came from Belgium, 97,956 tons from Germany and the Netherlands, and 10,727 tons from the United Kingdom.

Exports of fuel briquets are not shown separately from other miscellaneous articles in the customs statistics. The quantity exported is undoubtedly small.

Briquets and other composition coals for fuels imported for consumption in the United States, 1919–1926

Year	Net tons	Value	Year	Net tons	Value
1919	136	$1,050	1923	19,559	$103,201
1920	(1)	9	1924	38	443
1921	66	251	1925	6,758	43,931
1922	34,862	139,382	1926	123,593	736,804

[1] 112 pounds.

WORLD'S PRODUCTION

In spite of the gratifying increase of the last two years the production of fuel briquets in the United States is still very small in comparison with that in Germany, France, and Belgium. The following table presents the statistics available on the world's production of fuel briquets in the period 1922–1926. The figures are taken largely from official reports supplemented by data from trade sources, and are subject to revision upon the receipt of later returns. The world's production of briquetted fuel is now about 50,000,000 metric tons a year.

World's production of fuel briquets, 1922–1926, in metric tons[1]

Country	1922	1923	1924	1925	1926
Algeria	27,052	31,234	79,265	74,495	(2)
Belgium	2,497,350	1,929,260	2,030,310	2,237,171	2,150,150
Canada	(2)	36,626			
Czechoslovakia:					
Coal	64,792	99,631	75,710	156,345	181,000
Lignite	172,659	196,205	175,613	208,926	197,500
France	4,884,854	5,051,089	5,427,105	5,781,000	4,086,370
Germany:[3]					
Coal	5,757,671	1,941,535	4,359,476	5,590,613	5,359,096
Lignite	29,421,689	26,854,083	29,399,746	33,663,447	34,354,935
Hungary		45,251	27,535	32,412	58,854
Indo-China	30,933	46,426	76,211	89,820	(2)
Netherlands	626,432	473,579	562,181	570,717	(2)
Netherlands East Indies		12,387	28,373	22,644	(2)
Poland	(4)	309,467	444,231	375,100	239,200
Spain	675,884	663,667	627,014	670,974	763,062
United Kingdom:[5]	1,353,614	1,167,532	1,208,610	1,243,090	(2)
United States	561,930	632,132	526,591	761,460	902,945
Venezuela	6,900	3,611	3,475	2,043	(2)
	46,081,760	39,493,715	45,051,446	51,480,257	(2)

[1] Compiled by L. M. Jones, Bureau of Mines.
[2] Data not available.
[3] Exclusive of the Saar district under the control of France.
[4] The production of briquets in Polish Upper Silesia in 1922 was 198,057 tons. To include these figures in the above statement would involve duplication, as the output for January to May, 1922, is already included in the German production.
[5] Great Britain only; data for Ireland not available.

FULLER'S EARTH

By Jefferson Middleton

GENERAL CONDITIONS

The fuller's earth industry continued to show progress in 1926, the product sold or used by producers in the United States having increased both in quantity and value. Except during 1921, this industry has advanced steadily since 1912. The output for 1926—234,152 short tons, valued at $3,356,482—was reported by 14 operators in 7 States. This quantity was the largest ever recorded; it was 13 per cent greater than that of 1925 and more than three times that of 1916. The value of the output for 1926 was also the largest ever reported; it was 15 per cent more than that of 1925 and nearly five times that of 1916. For the first time since 1920 the average value per ton showed an increase compared with the preceding year; the average was $14.33 in 1926, an increase of 18 cents per ton compared with 1925. It was, however, considerably lower than that of any other year since 1919 except 1925 and was $5.18 less than that of 1920, the year of highest average value per ton. The imports of fuller's earth increased 14 per cent in quantity and 11 per cent in value in 1926 compared with 1925.

The apparent consumption of fuller's earth in the United States in 1926 was about 236,000 tons. The domestic earth used constituted 96 per cent of this total.

One problem in connection with the use of fuller's earth is its revivification by heating after it loses its filtering or bleaching power. In 1926 two papers appeared on this subject which may be of interest to the producers and consumers of this material. They are: "The life of fuller's earth used in the vapor-phase treatment of cracked distillates," by M. R. Mandlebaum and P. S. Nisson,[1] and "Revivifying fuller's earth in a modern filter plant [in an ore-roasting furnace]." [2]

The small number of producers in some States makes it impossible to publish totals for those States without revealing data for individual establishments. The South continues to lead in the production of fuller's earth, as 82 per cent of the output of 1926 was produced in Florida, Georgia, and Texas. Georgia led in production and value, with Florida second and Illinois third, Illinois displacing Texas. The quantity and value of the product increased in every important producing State except Texas in comparison with 1925, and the

[1] Industrial and Engineering Chemistry: Vol. 18, June, 1926, pp. 564–566.
[2] Chemical and Metallurgical Engineering: Vol. 33, August, 1926, pp. 472–473.

decreases in Texas were small—less than 1 per cent in quantity and about 3 per cent in value. The production in Texas in 1926 was 30,258 short tons, valued at $300,169.

OCCURRENCE

The occurrence of fuller's earth has been reported in Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Illinois, Massachusetts, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New York, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Virginia, and Washington, but in 1926 it was produced only in California, Florida, Georgia, Illinois, Massachusetts, Nevada, and Texas.

USES

Fuller's earth is used mainly as a filtering medium in clarifying or bleaching fats, greases, and mineral and vegetable oils. Its original use was in fulling woolen cloth, and from that it derived its name, but such use, at least in this country, has almost been abandoned. Fuller's earth is also said to be used in the manufacture of pigments for printing wall paper, in detecting certain coloring matters in some food products, as a substitute for talcum powder, and in medicine as a poultice and as an antidote for alkaloid poisons. Another suggested use is in deliming hides in the manufacture of leather. It has been stated that the fuller's earth cake from oil mills can be used in the manufacture of hand soaps, concrete, waterproofing, and asphalt preparations.[3]

HISTORY

Fuller's earth was first discovered in the United States in 1891 near Alexander, Ark., by John Olsen. The mineral was used for a time by the Southern Cotton Oil Co., at Little Rock, Ark., but its use was finally abandoned.[4] The real beginning of the industry in this country, however, was in 1893, near Quincy, Fla., when quite by accident, in an unsuccessful effort to burn brick on the property of the Owl Cigar Co., an employee called attention to the close resemblance between the clay used and the German fuller's earth. This discovery in Florida caused considerable excitement, and deposits of fuller's earth were reported from a number of States, but the material in most of these deposits was found to have no value as fuller's earth. Production began in Florida almost immediately after the discovery, and from 1897 to 1899 fuller's earth was produced in Florida, Colorado, New York, and Utah. Florida maintained its rank as the leading producer continuously until 1924. In 1901 Arkansas again became a producer. From 1904 to 1907 Arkansas was the second largest producer, but no production of fuller's earth has been reported from Arkansas since 1922. Fuller's earth was found in Georgia soon after the discovery in Florida, but Georgia did not become a producer until 1907, when it ranked third as a producing State; it ranked second from 1909 to 1923, except in 1918 and 1919 when Texas was second; and in 1924, 1925, and 1926 it

[3] Chemical and Metallurgical Engineering: Vol. 26, Mar. 29, 1922, p. 602.
[4] Branner, J. C., "An early discovery of fuller's earth in Arkansas": Trans. Am. Inst. Min. Eng., vol. 43, pp. 520–522, 1913.

ranked first. In 1904 Alabama and Massachusetts, in 1907 South Carolina and Texas, in 1909 California, in 1918 Nevada, and in 1922 Illinois and Pennsylvania first appeared as producers. Pennsylvania has reported none since 1922.

PRODUCTION

Fuller's earth sold or used by producers in the United States, 1917–1926

Year	Operators reporting sales	Short tons	Value at mines	
			Total	Average
1917	11	72,567	$772,087	$10.64
1918	14	84,468	1,146,354	13.57
1919	10	106,145	1,998,829	18.83
1920	12	128,487	2,506,189	19.51
1921	12	105,609	1,973,848	18.69
1922	15	138,944	2,289,719	16.48
1923	15	149,134	2,247,523	15.07
1924	13	177,994	2,632,342	14.79
1925	14	206,574	2,923,965	14.15
1926	14	234,152	3,356,482	14.33

IMPORTS AND EXPORTS

Imports of fuller's earth, which once constituted the entire supply, were increasing before the World War and reached their maximum in 1914. Since that time the general trend has been downward. In 1925 and 1926 there were slight increases—10 per cent in quantity in the former and 14 per cent in the latter year as compared with the preceding year in each case. The increases in 1926 as compared with 1925 were 1,083 tons and $12,379, or 14 and 11 per cent, respectively. The average value per ton of imported fuller's earth in 1926 declined 30 cents, or 2 per cent, as compared with 1925, which was the year of highest average value. In 1926 wrought or manufactured earth represented 98 per cent of the total quantity and value of the fuller's earth imported.

Fuller's earth imported for consumption in the United States, 1917–1926[1]

Year	Unwrought or unmanufactured			Wrought or manufactured			Total		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average
1917	1,441	$11,718	$8.13	15,553	$164,699	$10.59	16,994	$176,417	$10.38
1918	1,085	12,636	11.65	15,837	213,599	13.49	16,922	226,235	13.37
1919	373	4,301	11.53	13,500	185,410	13.73	13,873	189,711	13.67
1920	1,518	19,793	13.04	17,497	202,100	11.55	19,015	221,893	11.67
1921	483	6,172	12.78	9,261	113,243	12.23	9,744	119,415	12.26
1922	607	7,413	12.21	9,962	128,282	12.88	10,569	135,695	12.84
1923	642	8,252	12.85	7,905	105,692	13.37	8,547	113,944	13.33
1924	296	3,385	11.44	7,006	89,103	12.72	7,302	92,488	12.67
1925	215	2,619	12.18	7,800	108,676	13.93	8,015	111,295	13.89
1926	158	2,290	14.49	8,940	121,384	13.58	9,098	123,674	13.59

[1] Compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Exports of fuller's earth are not reported separately by the Bureau of Foreign and Domestic Commerce, but five operators stated to the Bureau of Mines that they exported 6,650 short tons in 1926 to Canada, Cuba, Germany, Mexico, Peru, and Rumania. This is an increase of 7 per cent over 1925 and is the largest quantity of fuller's earth reported as having been exported.

CARBON BLACK PRODUCED FROM NATURAL GAS

By G. R. Hopkins [1]

Statistics of the carbon-black industry in 1925 and 1926 in general foreshadow a period of stability, with a better balance between supply and demand than in many industries. The year 1926 witnessed a number of mergers or consolidations; in consequence, the number of producers declined from 42 in 1925 to 33 in 1926, although the number of plants remained virtually the same. The newcomers in the business principally represent established companies of the petroleum and natural-gas industries.

Production for 1926 was 180,576,176 pounds, valued at the plants at $9,939,221. This amount represents an increase in production over 1925 of 3,158,798 pounds, or 2 per cent, but does not, however, eclipse the record figure of 186,872,034 pounds established in 1924. Stocks at the plants December 31, 1926, amounted to 108,378,101 pounds, an increase of 12,354,653 pounds, or 13 per cent, over the preceding year. Losses at the plants in 1926 totaled a little over 700,000 pounds or about half what they were in 1925.

The production minus the addition to stocks and the losses gives total deliveries or sales for 1926 amounting to 167,504,710 pounds, as compared with 175,631,326 pounds in 1925, a decrease of 8,126,616 pounds, or 5 per cent. This is the first time since carbon-black statistics were compiled that total sales have shown a decrease.

The distribution of carbon-black deliveries among industries in 1925, as determined by a survey recently completed, was as follows:

Carbon black distributed by producers in 1925, by industries

Industry	Pounds	Per cent
Rubber	86, 329, 000	49. 2
Export	43, 183, 000	24. 6
Ink	22, 389, 000	12. 7
Paint	11, 757, 000	6. 7
Miscellaneous	11, 973, 000	6. 8
	175, 631, 000	100. 0

Although similar data for 1926 are available for exports only, the amounts used in the ink, paint, and miscellaneous trades appear to be practically unchanged, the major portion of the decline in total sales being chargeable to exports and to the big consumer, the rubber industry.

The total value at the plants of the carbon-black production in 1926 was approximately $10,000,000, an average of 5.5 cents per pound. This value represents an increase of 0.1 cent over the low

[1] Figures on domestic industry were prepared by H. Backus, and those on exports were compiled, from records of the Bureau of Foreign and Domestic Commerce, by J. A. Dorsey, both of the Bureau of Mines.

point of 1925 but is still considerably below the average for the five-year period 1919 to 1923. The decrease in average value in 1925 in the face of greatly increased demand and the increase in average value in 1926 in the face of decreased demand were interesting. However, the spot market price of carbon black at New York in 1926 averaged slightly lower than in 1925.

Technical advances and the willingness of the carbon-black manufacturers to cooperate to further conservation enabled the industry in 1926 to produce more carbon black from less gas. The estimated quantity of natural gas used in 1926 to produce the 180,576,176 pounds of carbon black was 130,321,000 M cubic feet, indicating an average yield of 1.4 pounds per 1,000 cubic feet, an increase of 0.1 pound over 1925 and the highest yield ever recorded.

Louisiana remained the outstanding producing State, its output in 1926 of over 130,000,000 pounds comprising 72 per cent of the total for the country. West Virginia produced 3,804,586 pounds of carbon black in 1926, a decline of 7,043,208 pounds, or 65 per cent, from 1925. This State, once the leader in the industry, is now producing only 15 per cent of its output six years ago and only 2 per cent of the output of the country. Carbon-black manufacture at present prices depends on cheap gas, of which little is left in West Virginia. Texas showed the greatest gain in production of any of the States, its output amounting to 36,328,052 pounds as against 26,219,510 pounds in 1925, a gain of 39 per cent. This material increase in Texas more than compensated for the decline in West Virginia and Kentucky. Three new plants began production in Texas during the year, two in Stephens County and one in Hutchinson County. The latter was the first carbon-black plant to enter the great Amarillo gas field, although many have been projected.

The channel process remained by far the most important method of manufacturing carbon black, producing 152,300,410 pounds in 1926, as compared with 28,275,766 pounds by other processes.

Exports of carbon black in 1926 amounted to 39,210,389 pounds, as compared with 43,182,635 pounds in 1925. The 1926 exports had an average value of 9.2 cents, as compared with 8.2 cents in 1925. The United Kingdom was our leading carbon-black customer in 1926 followed in order by France, Canada, and Germany. Of these four countries, France alone showed an increase over 1925.

Summary of statistics of carbon black made from natural gas in the United States, 1921–1926

	1921	1922	1923	1924	1925	1926
Number of producers reporting	23	26	47	46	42	33
Number of plants	41	43	69	69	63	62
Quantity produced:						
Louisiana, pounds	31,003,615	41,966,856	101,398,881	144,601,550	129,839,907	130,376,987
Texas, do			2,633,013	13,764,014	26,219,510	36,328,052
Kentucky, do	2,697,075	4,306,875	10,058,887	10,135,435	7,309,378	6,309,826
West Virginia, do	25,073,000	20,095,481	20,038,415	15,045,448	10,847,794	3,804,586
Other States, do	992,625	1,425,917	4,133,452	3,325,587	3,200,789	3,756,725
Total, do	59,766,315	67,795,129	138,262,648	186,872,034	177,417,378	180,576,176
Produced by:						
Channel process, do	(1)	(1)	116,696,891	162,257,725	143,701,153	152,300,410
Other processes [2], do	(1)	(1)	21,565,757	24,614,309	33,716,225	28,275,766
Stocks held by producers Dec. 31, pounds	(1)	2,434,547	38,320,814	95,671,246	96,023,448	108,378,101
Losses, do	(1)	(1)	165,885	660,836	1,433,850	716,813
Sales, do	(1)	(1)	102,210,496	128,860,766	175,631,326	167,504,710
Value (at plants) of carbon black produced:						
Total, dollars	5,445,878	5,819,618	11,692,066	11,564,936	9,639,585	9,939,221
Average per pound, cents	9.1	8.6	8.5	6.2	5.4	5.5
Estimated quantity of natural gas used, M cubic feet	50,565,000	53,629,000	109,096,000	156,514,000	140,366,000	130,321,000
Average yield per M cubic feet, pounds	1.2	1.3	1.3	1.2	1.3	1.4

[1] Not reported.
[2] Including chain, disk, plate, ring, roller, "special," thermatomic, and Horton.

Carbon black produced from natural gas in the United States, 1925–26, by States

State	Producers reporting	Number of plants	Pounds	Value at plant		Estimated quantity of natural gas used	Average yield per M cubic feet
				Total	Average		
1925					*Cents*	*M cubic ft.*	*Pounds*
Louisiana	29	34	129,839,907	$6,993,162	5.4	109,380,000	1.2
Texas	5	7	26,219,510	1,317,763	5.0	16,854,000	1.6
West Virginia	8	14	10,847,794	805,612	7.4	7,161,000	1.5
Kentucky	5	4	7,309,378	372,067	5.1	3,981,000	1.8
Wyoming	1	1	3,200,789	150,981	4.7	2,990,000	1.1
Montana	1	1					
Colorado	1	1					
Pennsylvania	1	1					
	[1] 42	63	177,417,378	9,639,585	5.4	140,366,000	1.3
1926							
Louisiana	22	34	130,376,987	6,955,771	5.3	99,066,000	1.3
Texas	8	10	36,328,052	2,132,424	5.9	21,989,200	1.7
Kentucky	2	3	6,309,826	322,642	5.1	3,124,000	2.0
West Virginia	6	10	3,804,586	312,712	8.2	2,586,000	1.5
Wyoming	1	1	3,756,425	215,651	5.7	3,555,560	1.1
Montana	2	2					
Pennsylvania	1	1					
Colorado	1	1	300	21	7.0	240	1.3
	[1] 33	62	180,576,176	9,939,221	5.5	130,321,000	1.4

[1] In counting the total number of producers a producer operating in more than one State is counted only once.

Carbon black exported from the United States, 1925–26, by countries

Country	1925		1926	
	Pounds	Value	Pounds	Value
Australia	1,177,956	$102,115	1,496,699	$143,855
Belgium	999,957	86,731	945,839	89,058
Canada	5,951,976	369,588	4,665,295	360,545
China	586,678	53,460	602,721	54,628
France	6,922,948	573,197	9,288,361	857,473
Germany	7,365,262	670,978	4,307,441	403,249
Italy	1,964,340	166,520	2,427,619	232,118
Japan	1,572,312	126,459	2,816,969	270,545
Netherlands	662,287	64,645	492,126	50,262
United Kingdom	14,903,704	1,221,119	11,010,065	1,039,182
Other	1,075,215	120,957	1,157,254	121,992
	43,182,635	3,555,769	39,210,389	3,622,907

FLUORSPAR AND CRYOLITE

By Hubert W. Davis

FLUORSPAR

Fluorspar, or fluorite, is a nonmetallic crystalline mineral that usually occurs in glassy transparent isometric crystals, largely cubic, or in cleavable masses. Less commonly it has a granular or fibrous structure, and occasionally it is banded. Fluorspar has a specific gravity of 3.2, is brittle, has a hardness of 4, and can easily be scratched with a knife. Fluorspar is a mineral of many colors, ranging from clear, colorless, or slightly bluish, and glasslike through various striking hues, of which purple and green are most common; much of it is white and opaque. Chemically it consists of calcium and fluorine in the proportion of 51.1 to 48.9.

FLUORSPAR PRODUCED AND SHIPPED

The steel industry, the largest user of fluorspar, made a record output; the fluorspar producers did a larger volume of business in 1926 than in 1925. The increase in shipments of fluorspar from domestic mines, however, did not keep pace with the increase in imports of fluorspar, which were the largest on record.

Shipments of domestic fluorspar to steel plants were 15 per cent more than in 1925, and those to manufacturers of glass and enamel showed increases of 11 and 5 per cent, respectively. The exports, though small, were twice as large as in 1925 and are the largest recorded since 1922. The demand for domestic fluorspar by chemical manufacturers was about 23 per cent less than in the preceding year, and the shipments to foundries were about the same as in 1925.

In 1926 shipments of fluorspar from domestic mines aggregated 128,657 short tons, valued at $2,341,277, or an increase of 13 per cent in quantity and of 14 per cent in total value compared with 1925. The general average value per ton f. o. b. mines or shipping points for all grades in 1926 was $18.20, which is 14 cents higher than the average in 1925. The general average value of the fluorspar shipped to steel plants in 1926 from the Illinois-Kentucky district was $16.98 a ton and from the Colorado-New Mexico district $12.69 a ton. This difference in average values does not necessarily represent differences in quality of fluorspar from these two districts, but differences in freight costs from the mines to consuming centers.

The table that follows presents such details of the shipments of fluorspar for 1923 to 1926, by States, as may be published without revealing, except by permission, the statistics of individual producers.

Fluorspar shipped from mines in the United States, 1923–1926

State	Gravel			Lump			Ground			Total		
	Short tons	Value		Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average		Total	Average
1923												
Colorado	3,957	$36,631	$9.26	2,087	$23,079	$11.06				6,044	$59,710	$9.88
Illinois	52,249	1,013,927	19.41	5,659			7,137			65,045	1,443,490	22.19
Kentucky	39,394	756,701	19.21	2,432	232,846	26.37	3,615	$398,118	$36.86	45,441	945,402	20.81
New Mexico	3,540	38,161	10.78	738			50			4,328	50,861	11.75
New Hampshire				142	3,160	22.25				142	3,160	22.25
Utah				188	3,196	17.00				188	3,196	17.00
	99,140	1,845,420	18.61	11,246	262,281	23.32	10,802	398,118	36.86	121,188	2,505,819	20.68
1924												
Colorado	11,986	130,791	10.91	315	4,620	14.67				12,301	135,411	11.01
Illinois	54,541	1,042,089	19.11	2,766			4,760			62,067	1,288,310	20.76
Kentucky	41,809	789,352	18.88	932	108,090	22.68	5,106	356,871	35.89	47,847	988,940	20.67
New Mexico	1,620	19,318	11.92	883			77			2,580	35,178	13.63
Utah				184						184	3,292	17.89
	109,956	1,981,550	18.02	5,080	112,710	22.19	9,943	356,871	35.89	124,979	2,451,131	19.61
1925												
Colorado	10,560	137,343	13.01	1,216	16,364	13.46				11,776	153,707	13.05
Illinois	46,195	783,451	16.96	3,366			4,867			54,428	1,024,516	18.82
Kentucky	39,153	669,672	17.10	1,176	115,814	21.13	4,497	308,881	32.25	44,826	833,794	18.60
New Mexico	1,487	20,817	14.00	939			213			2,639	40,325	15.28
	97,395	1,611,283	16.54	6,697	132,178	19.74	9,577	308,881	32.25	113,669	2,052,342	18.06
1926												
Illinois	47,254	812,129	17.19	1,780			4,700			53,734	1,012,879	18.85
Kentucky	53,386	912,525	17.09	2,641	108,710	20.54	6,467	363,713	32.26	62,494	1,167,129	18.68
New Mexico	1,063	144,200	12.59	820			106			1,989	161,269	12.98
Colorado	10,389			51						10,440		
	112,092	1,868,854	16.67	5,292	108,710	20.54	11,273	363,713	32.26	128,657	2,341,277	18.20

HISTORY OF PRODUCTION

The accompanying table presents statistics of the production of fluorspar in different States beginning with 1880. The record of production prior to 1880 was not obtained, and the statistics for Kentucky and Colorado are incomplete for certain years after 1880, so that more fluorspar has been mined than the table shows. The unrecorded output must be small, however, as the advantages of fluorspar over limestone as a flux in basic open-hearth steel plants have been generally recognized only since about 1899. Before that time fluorspar was used mainly in the preparation of hydrofluoric acid and in the manufacture of opalescent glass; consequently the demand was small.

The production of fluorspar by years for 1880 to 1904, a brief discussion of the history of mining in the different States, and estimates of unrecorded output in early years are given in Mineral Resources for 1925, part 2, pp. 9 to 14.

Fluorspar produced [1] in the United States, 1880–1926, by States

Year	Arizona		Colorado		Illinois		Kentucky		Nevada		New Hampshire		New Mexico		Tennessee		Utah		Washington		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1880–1904	654	$6,593	------	------	169,870	$1,037,399	134,186	$740,467	------	------	------	------	------	------	400	$3,400	------	------	------	------	305,110	$1,787,859
1905	------	------	1,156	$8,200	33,275	220,206	22,694	132,362	------	------	------	------	------	------	260	1,720	------	------	------	------	57,385	362,488
1906	------	------	300	1,800	28,268	160,623	11,868	79,802	------	------	------	------	------	------	360	1,800	------	------	------	------	40,796	244,025
1907	------	------	3,300	11,400	25,128	141,971	21,058	133,971	------	------	------	------	------	------	------	------	------	------	------	------	49,486	287,342
1908	34	252	701	4,266	31,727	172,838	6,323	48,642	------	------	------	------	------	------	------	------	------	------	------	------	38,785	225,998
1909	30	435	350	2,100	41,852	232,251	7,800	53,233	------	------	------	------	710	$3,728	------	------	------	------	------	------	50,742	291,747
1910	------	------	268	1,608	47,302	277,764	17,003	124,574	------	------	------	------	4,854	26,250	------	------	------	------	------	------	69,427	430,196
1911	------	------	721	4,226	68,817	481,635	12,403	96,574	------	------	800	$6,400	4,307	22,612	------	------	------	------	------	------	87,048	611,447
1912	------	------	1,639	9,834	103,937	695,467	10,473	61,186	------	------	300	1,500	196	1,176	------	------	------	------	------	------	116,545	769,163
1913	100	800	4,432	26,592	85,854	550,815	19,622	113,903	------	------	200	1,200	5,372	42,976	------	------	------	------	------	------	115,580	736,286
1914	------	------	1,978	12,992	73,811	426,063	19,077	128,986	------	------	250	2,000	------	------	------	------	------	------	------	------	95,116	570,041
1915	------	------	247	1,482	116,340	624,040	19,219	129,873	------	------	650	5,200	485	3,880	------	------	------	------	------	------	136,941	764,475
1916	199	2,587	8,669	42,457	126,369	746,150	19,698	123,596	------	------	800	7,864	------	------	------	------	------	------	------	------	155,735	922,654
1917	135	1,080	17,104	196,633	156,676	1,373,333	43,639	697,566	------	------	1,274	19,110	------	------	------	------	------	------	------	------	218,828	2,287,722
1918	364	5,537	38,475	416,780	132,798	2,887,099	87,604	2,069,185	------	------	1,059	21,243	3,437	64,348	------	------	20	$465	60	$824	263,817	5,465,481
1919	45	450	9,687	150,739	92,729	2,430,361	32,386	883,171	400	$5,600	531	12,826	2,346	37,643	------	------	166	4,784	------	------	138,290	3,525,574
1920	181	3,264	12,852	251,308	120,299	3,096,767	46,091	1,246,942	532	8,672	202	4,040	6,353	101,460	------	------	268	6,094	------	------	186,778	4,718,547
1921	------	------	3,143	39,907	12,477	315,767	15,266	294,513	------	------	567	13,721	3,507	60,186	------	------	------	------	------	------	34,960	724,094
1922	------	------	2,309	20,169	83,855	1,493,188	52,484	970,059	------	------	690	15,353	2,180	30,992	------	------	78	1,404	------	------	141,596	2,531,165
1923	------	------	6,044	59,710	65,045	1,443,490	45,441	945,402	------	------	142	3,160	4,328	50,861	------	------	188	3,196	------	------	121,188	2,505,819
1924	------	------	12,301	135,411	62,067	1,288,310	47,847	988,940	------	------	------	------	2,580	35,178	------	------	184	3,292	------	------	124,979	2,451,131
1925	------	------	11,776	153,707	54,428	1,024,516	44,826	833,794	------	------	------	------	2,639	40,325	------	------	------	------	------	------	113,669	2,052,342
1926	------	------	10,440	[2] 161,269	53,734	1,012,879	62,494	1,167,129	------	------	------	------	1,989	([2])	------	------	------	------	------	------	128,657	2,341,277
	1,742	20,998	147,892	[2] 1,712,590	1,786,658	22,132,932	799,502	12,063,870	932	14,272	7,465	113,617	45,283	[2]521,615	1,020	6,920	904	19,235	60	824	2,791,458	36,606,873

[1] Beginning with 1906 figures represent shipments from mines.

[2] Value for New Mexico for 1926 included with Colorado.

SHIPMENTS, BY USES

The table that follows shows the relative dependence of the fluorspar industry on the different industries in which fluorspar is used. The predominance of the steel industry as a purchaser of fluorspar is evident. The high value of fluorspar for hydrofluoric acid, glass, and enamel and sanitary ware is due to the high quality demanded.

Fluorspar shipped from mines in the United States, 1925–26, by uses

Use	1925				1926			
	Percentage	Short tons	Value		Percentage	Short tons	Value	
			Total	Average			Total	Average
Steel	80.73	91,760	$1,482,461	$16.16	82.09	105,614	$1,744,085	$16.51
Foundry	5.52	6,275	121,177	19.31	4.83	6,212	121,453	19.55
Glass	5.95	6,767	211,331	31.23	5.83	7,507	240,288	32.01
Enamel and sanitary ware	2.85	3,237	101,060	31.22	2.65	3,410	113,445	33.27
Hydrofluoric acid (including fluorspar used in manufacture of aluminum and refining of lead)	3.92	4,455	114,059	25.60	2.65	3,410	79,105	23.20
Miscellaneous	.10	120	4,680	39.00	.29	372	7,986	21.47
	99.07	112,614	2,034,768	18.07	98.34	126,525	2,306,362	18.23
Exported	.93	1,055	17,574	16.66	1.66	2,132	34,915	16.38
	100.00	113,669	2,052,342	18.06	100.00	128,657	2,341,277	18.20

In 1926 fluorspar was produced in four States—Colorado, Illinois, Kentucky, and New Mexico—of these only Kentucky showed an increase.

The production of crude fluorspar in 1926 is estimated at 245,253 short tons, which is equivalent to 133,077 tons of merchantable fluorspar. The quantity of crude fluorspar treated in 1926 was 242,674 short tons, from which was recovered 130,918 tons of merchantable fluorspar. Thus, for each ton of merchantable fluorspar recovered in 1926, 1.85 tons of crude fluorspar was handled.

Fluorspar-bearing rock mined in 1926, by States, in short tons

State	Mines and prospects worked	Fluorspar-bearing rock mined	Merchantable fluorspar equivalent
Illinois	9	84,575	50,053
Kentucky	36	133,203	70,585
Colorado and New Mexico	6	27,475	12,439
	51	245,253	133,077

Fluorspar-bearing rock treated and merchantable fluorspar recovered in 1926, by States where mined, in short tons

State	Fluorspar-bearing rock treated	Merchantable fluorspar recovered	Ratio of treated rock to fluorspar recovered
Illinois	92,291	55,088	1.675
Kentucky	123,467	63,616	1.941
Colorado and New Mexico	26,916	12,214	2.204
	242,674	130,918	1.854

FLUORSPAR INDUSTRY IN 1926, BY STATES

COLORADO

The shipments of fluorspar from Colorado mines in 1926 amounted to 10,440 short tons, a decrease of 11 per cent from 1925. Of these shipments 10,054 tons was sold for use in steel plants, 385 tons for use in foundries, and 1 ton was sold for unknown use.

In 1926, as in 1925, the Wagon Wheel Gap mine, 1¼ miles southwest of Wagon Wheel Gap, in Mineral County, was the largest producer of fluorspar in Colorado. About 44 per cent of the shipments from this mine in 1926 went to the steel works at Pueblo, Colo., and the remainder, 56 per cent, went to consumers in the mid-west and on the Pacific coast.

The only mine in Jackson County from which fluorspar is produced is about 3 miles northwest of Northgate. It was worked about two and one-half months in 1926, during which time development work was carried on and an additional stope was opened for production. The fluorspar produced at this mine in 1926 was of fluxing grade and was shipped to mid-west markets.

During 1926 some fluorspar of fluxing grade was produced in the Jamestown district, in Boulder County; all of it was treated at the Lehman mill, whence it was shipped to a mid-west consumer.

The names and addresses of shippers of fluorspar from Colorado in 1926 are given below:

Shippers of fluorspar from Colorado in 1926

Colorado Fluorspar Corporation	Cowdrey, Colo.
Colorado Fuel & Iron Co	Denver, Colo.
E. W. Lehman	Jamestown, Colo.

ILLINOIS

In 1926 the quantity of crude fluorspar milled in Illinois aggregated 92,291 short tons, from which was recovered 55,088 tons of merchantable fluorspar, a loss in treating of 37,203 tons and a ratio of 1.675:1. In 1926 shipments of fluorspar from Illinois amounted to 53,734 short tons, or a decrease of about 1 per cent; they were reported distributed among the various industries as follows:

Distribution among the various industries of fluorspar from Illinois in 1926

Industry:	Short tons
Steel	45,328
Foundry	1,854
Glass	3,009
Enamel	1,591
Hydrofluoric acid	1,501
Miscellaneous	371
Exported	80
	53,734

In 1926, as in 1925, the Daisy mine was the largest producer of fluorspar in Illinois. The output of this mine was supplemented by considerable fluorspar from the Empire mine, which is worked under lease by the operators of the Daisy mine. Exploration and development work conducted during the year at the Daisy mine and north

of it was reported as satisfactory, maintaining ore reserves well ahead of mining. Two hydraulic classifiers, 6 drag dewatering machines, and 6 concentrating tables were added to the Rosiclare mill, at which the ore from the Daisy and Empire mines is treated. This improvement has increased mill efficiency considerably and has given better separation of fluorspar and gangue and a better quality of concentrate. The mill equipment, which was formerly supplied with direct current, is being converted to use alternating current. At the Daisy mine alternating current was substituted for direct during 1926.

During 1926 the Franklin Fluorspar Co. did no actual mining of fluorspar at its Illinois mines, although some crude fluorspar was recovered in cleaning up the mines. Its mill, however, was operated during the year, treating stock pile and purchased fluorspar and mill tailings. This company is reported to have done some experimental work on the flotation of fluorspar.

The Hillside mine, on the eastern extension of the Rosiclare vein, was worked on a considerably increased scale during 1926. A new body of fluorspar was reported developed.

At the Spar Mountain mine, located about 5 miles northeast of Cave in Rock, Ill., considerable important development work was reported done in 1926, resulting in materially increasing the existing reserves. The mill in which the fluorspar from this mine is treated is situated at Cave in Rock, from which the finished fluorspar is transported about 25 miles up the Ohio River to Shawneetown, Ill., whence it is transferred to railroad cars and shipped to consumers. A large quantity of fluorspar was shipped from this mine in 1926.

Some fluorspar was mined at the Dimick and Patrick mines, near Rosiclare, Ill., and was sold to the Franklin mill.

A deposit of fluorspar on the Knight property in Pope County was being developed during 1926, in the course of which a small quantity of fluorspar was mined but not sold.

Some development work was done in 1926 at the Lead Hill mine, about 4 miles northeast of Cave in Rock, and some fluorspar was mined and shipped.

A list of producers of fluorspar in Illinois in 1926, with their post-office addresses, follows:

Producers of fluorspar in Illinois in 1926

Basic Mineral Co	Pittsburgh, Pa.
Benzon Fluorspar Co	Cave in Rock, Ill.
Dimick, W. E	Rosiclare, Ill.
Douglas Fluorspar Mines Co	Karbers Ridge, Ill.
Franklin Fluorspar Co	Paducah, Ky.
Hillside Fluor Spar Mines	Chicago, Ill.
Knight, E. A. and A. D	Rosiclare, Ill.
Rosiclare Lead & Fluorspar Mining Co	Cleveland, Ohio.
Troutman, W. E	Rosiclare, Ill.

KENTUCKY

The quantity of crude fluorspar treated in Kentucky in 1926 was 123,467 short tons, from which was recovered 63,616 tons of merchantable fluorspar, a loss in milling of 59,851 tons and a ratio of 1.941:1.

The shipments of fluorspar from Kentucky in 1926 amounted to 62,494 short tons, an increase of 39 per cent over 1925. They were the second largest ever recorded for that State, and for the second time since 1904 they exceeded those of Illinois. The shipments of fluorspar from Kentucky in 1926 were distributed among the industries as follows:

Distribution among the various industries of fluorspar from Kentucky in 1926

Industry:	Short tons
Steel	48,774
Foundry	3,548
Glass	4,498
Enamel	1,743
Hydrofluoric acid	1,879
Exported	2,052
	62,494

In 1926 much activity in the development of bodies of fluorspar was reported in Caldwell County, Ky. The deposits in this county occur east and southeast of Fredonia and north and northwest of Princeton. At the Marble property, about 4 miles east of Fredonia, where fluorspar is reported to have been first mined in Caldwell County, development work was begun in July, 1926, and continued with satisfactory results until November 1. The present operators have located about 500 feet from the old workings, and report that they have found in virgin ground a shoot of fluorspar which appears to be larger and better than that at the old workings. Some fluorspar was found within 5 feet of the surface. The shaft has been sunk 50 feet and a 135-foot level has been driven in ore 3 to 5 feet wide. This new work has developed a large supply of fluorspar. Development work was reported in progress on an adjoining property, to which the same vein extends.

A fluorspar property 2½ miles from Crider, in Caldwell County, which was being developed in 1925 by the Princeton Spar Co., was leased on February 12, 1926, to the Pigmy Corporation, which conducted mining operations on a small scale.

A small quantity of fluorspar mined from a deposit near Princeton was shipped to Marion, Ky., where it was treated in the mill of the Kentucky Fluorspar Co.

The Watson (or Liberty Bond) mine, 7 miles southwest of Marion, was operated on a much enlarged scale during 1926. About one-fifth of the product from this mine was shipped for use in the manufacture of hydrofluoric acid and the remainder was sold to the Franklin and Kentucky mills at Marion.

In 1926 the Franklin Fluorspar Co. handled the output of its own mines—the Susie Beeler, Mary Belle, Memphis, Brown, Ada Florence, Beard, Loveless, Cross, and Tyner mines, which are 5 to 15 miles from Marion, and the Haffaw mine, situated about 1 mile from Mexico, Ky.—and to meet requirements purchased considerable fluorspar from the Watson, Butler, Summers, Davenport, Holly, and other mines. This company has well-equipped mills located at Marion and Mexico, where the fluorspar from its own mines and that purchased is prepared for the market. The Loveless and Cross (or Ebbie Hodge) mines were purchased by the Franklin

Fluorspar Co. in 1926, and the Manley and Tyner mines were leased for 5 and 10 years, respectively.

The Lucile mine was one of the important producers of fluorspar in the Kentucky district in 1926. This mine is a short distance south of the railroad station at Marion and is of particular interest because of its remoteness from other productive mines, the nearest being about 5 miles. Operations at the Lucile mine were suspended about 1922 as the vein seemed to be exhausted, but a cave-in in the old workings later showed a little fluorspar, which upon being traced revealed a large body. From October 15, 1925, to December 31, 1926, this vein has yielded about 5,700 tons of crude fluorspar. The fluorspar from this mine is treated in the Kentucky mill, which is adjacent to the mine, on a tonnage basis for the producer.

During 1926 development work, including the sinking of a shaft from the 170–foot level to the 270–foot level and crosscutting to and drifting on the vein, was done at the Lafayette mines, near Mexico, Ky. Mining operations included both development of virgin fluorspar bodies and recovery of fluorspar remaining in old workings of former operators. During the year the concentrating plant, which is connected with the mines by a narrow-gauge railroad, was enlarged and revised to increase the capacity of fluorspar production and to improve the recovery of lead and zinc. An engine house and a headframe for the new shaft were installed, two employees' residences and minor surface construction were completed, and the water-supply reservoir for the mill was enlarged.

The Blue & Marble mine, about 1 mile south of Mexico, Ky., shipped about one-fourth less fluorspar than in 1925.

The Holly mine, about 10 miles west of Marion, Ky., was worked on an increased scale in 1926.

The Davenport mine, about 8 miles from Marion, Ky., produced about five times as much fluorspar as in 1925, all of which was sold to the local mills.

The Kentucky Fluorspar Co., which has a mill a short distance south of the station of Marion, did a larger volume of business than in 1925; its sales consisted of about 59 per cent of ground fluorspar and 41 per cent of fluxing grades. This company does not operate any mines, but buys part or all of the output of many local mines and prospects. In 1926 it obtained its supply mainly from the Pogue, Lucile, Holly, Summers, Nancy Hanks, and Hodge mines. Considerable custom milling on a contract or tonnage basis is done at this mill.

During 1926 about 17,000 short tons of fluorspar was sold to the Kentucky and Franklin mills in Kentucky. By buying fluorspar outright or by treating it on contract or on a tonnage basis these mills thus enable many producers to work deposits that are too small to warrant the expense of installing the necessary equipment for preparing fluorspar that will meet the requirements of consumers. Moreover, they provide a market for producers who do not have direct market connections and for those who have mines with a capacity to produce in excess of the demand of their customers.

In Livingston County the largest producing mine is the Bonanza, situated about 1½ miles southwest of Lola and about 18 miles west of Marion, the shipping point. This mine, which is equipped with a

mill of 50-ton capacity, was operated on a much reduced scale in 1926, producing about half as much fluorspar as in 1925.

The Nancy Hanks mine, about 1½ miles southeast of Salem and about 13 miles southwest of Marion, produced some fluorspar which was sold to the Kentucky mill at Marion.

The mining activities at the Hudson mine, about 2½ miles southwest of Salem, are directed mainly toward the production of zinc carbonate, although fluorspar occurs and some was produced in 1926.

The Butler and Cullens mines, near Salem, Livingston County, reported a small production of fluorspar in 1926.

The list that follows contains the names and office addresses of operators of fluorspar mines or mills in Kentucky that sold 300 tons or more each in 1926.

Operators of chief fluorspar mines or mills in Kentucky in 1926

Conger, Wring & Co	Mexico, Ky.
Eagle Fluor Spar Co	Wheeling, W. Va.
Franklin Fluorspar Co	Paducah, Ky.
Gugenheim Mining Co	Marion, Ky.
Haynes, W. V	Marion, Ky.
Henry & Frazer	Marion, Ky.
Holly Fluorspar Co	Marion, Ky.
Independent Fluorspar Co	Marion, Ky.
Kentucky Fluorspar Co	Marion, Ky.
Keystone Fluorspar & Lead Co	Hopkinsville, Ky.
Lafayette Fluorspar Co	Duluth, Minn.
Pigmy Corporation (Oglebay Norton & Co.)	Cleveland, Ohio.
Stewart Spar Co	Marion, Ky.
United Mining Co	Lola, Ky.

NEW MEXICO

Shipments of fluorspar from New Mexico in 1926 aggregated 1,989 short tons, a decrease of 25 per cent from 1925.

The Tortugas mine, near Mesilla Park, Dona Ana County, was the main producer and shipper of fluorspar in New Mexico in 1926. The main shaft at this mine is sunk 286 feet. The fluorspar is reported to be blocked out from the 150-foot level to the 286-foot level, with the best showing on the lower level. In 1926 the operators of the Tortugas mine also worked a property near Deming, Luna County.

Sierra County reported considerable activity in the development of bodies of fluorspar and in installing equipment to treat the ore. At a property near Derry and 23 miles from Hatch, the shipping point, two claims have been reported leased to an operator who is said to be installing a mill that would produce 50 tons of finished product a day. The mill will consist of a decrepitator and tables.

Development work was reported carried on during 1926 at a property 4½ miles south of Hot Springs and about 25 miles from Engle, the shipping point. A mill that will handle 2 tons of crude ore an hour and make high-grade ground fluorspar has been completed. A small quantity of 100-mesh ground fluorspar averaging 96.5 per cent of calcium fluoride and 1.6 per cent of silica was shipped to a manufacturer of hydrofluoric acid. Equipment for concentrating the fluorspar to 98 per cent of calcium fluoride and 1 per cent of silica is said to be under construction.

The Lava Gap mine, in Socorro County, 28 miles from Oscuro, the shipping point, was nonproductive in 1926, but a small quantity of lump fluorspar from stock was shipped to a foundry.

Producers and shippers of fluorspar from New Mexico in 1926 were as follows:

Producers and shippers of fluorspar from New Mexico in 1926

Fluor Spar Mines of America	Hot Springs, N. Mex.
Hayner & Manasse	Las Cruces, N. Mex.

STOCKS OF FLUORSPAR AT MINES OR SHIPPING POINTS

According to the reports of producers the total quantity of fluorspar in stock at the mines or at shipping points at the close of 1926 amounted to 68,997 short tons, an increase of 3 per cent over 1925. These stocks consisted of 20,731 tons of ready-to-ship fluorspar and of 48,266 tons of crude fluorspar still to be milled, calculated to be equivalent to about 27,000 tons of ready-to-ship fluorspar. As the quantity of fluorspar in stock piles must be partly estimated, the mine reports vary from year to year, preventing an absolute balance between the quantity mined and the quantity shipped and in stock.

Stocks of fluorspar at mines or shipping points in the United States, 1925–26, by States, in short tons

State	1925			1926		
	Crude [1]	Ready-to-ship	Total	Crude [1]	Ready-to-ship	Total
Arizona	175	225	400	175	225	400
Colorado	1,048	250	1,298	1,048	40	1,088
Illinois	12,266	12,530	24,796	4,516	13,193	17,709
Kentucky	30,318	9,216	39,534	41,419	6,933	48,352
Nevada	250	280	530	250	280	530
New Mexico	230	50	280	810	60	870
Texas	48		48	48		48
	44,335	22,551	66,886	48,266	20,731	68,997

[1] The greater part of this crude (run-of-mine) fluorspar must be beneficiated before it can be marketed.

IMPORTS AND EXPORTS [1]

The total imports of fluorspar into the United States in 1926 amounted to 75,671 short tons, valued [2] at $747,237, and are the largest ever recorded. The imports in 1926 showed an increase of 55 per cent in quantity and 59 per cent in total value over 1925. The value assigned to the foreign fluorspar averaged $9.87 a ton. The cost to the consumers in the United States includes, in addition, the duty of $5 a short ton, loading charges at the docks, the ocean freight

[1] Figures on imports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce; those on exports were supplied by the producers. No exports of fluorspar are recorded by the Bureau of Foreign and Domestic Commerce.

[2] "The value of imported merchandise * * * is the foreign value or the export value, whichever is higher, that is, the market value or the price at which the merchandise, at the time of exportation to the United States, is offered for sale in the principal markets of the country from which exported, including the cost of containers or coverings and all expenses (including any export tax) incident to placing the merchandise in condition ready for shipment to the United States, as defined in section 402 of the tariff act of 1922."

charges, and other charges, besides the freight charges from docks to manufacturers' plants.

The imports were equivalent to 59 per cent of the domestic shipments of fluorspar, as compared with 43 per cent in 1925.

The United Kingdom continues to be the chief source of imported fluorspar, supplying 39 per cent of the total in 1926. Most of the fluorspar from this source is of fluxing grade, and the cost to consumers in the United States is reported to have ranged between $14.50 and $19 a short ton, duty paid, at tidewater; the lower price was for material of off grade, some of which containing as low as 83 per cent of calcium fluoride and 6 per cent of silica was imported in 1926. According to reports of importers of 26,259 short tons of English fluorspar which was sold to steel manufacturers, the selling price of this quantity at tidewater, duty paid, averaged between $16.75 and $17 a short ton.

In 1926 the imports of fluorspar from Germany showed an increase of 75 per cent in quantity. Although the greater part of the fluorspar from Germany was sold for use in steel plants, some ground fluorspar was imported and sold to manufacturers of glass and enamel. A small quantity of fluorspar for use in the manufacture of hydrofluoric acid was also imported, the selling price of which was said to have ranged between $28 and $32 a short ton, duty paid, at tidewater. German fluorspar sold to manufacturers of glass and enamel was reported to have brought between $30 and $40 a short ton, duty paid, at tidewater, and that sold to steel plants between $16 and $17.50 a short ton, duty paid, at tidewater. About 1,400 short tons of ground fluorspar and more than 300 tons of acid-grade fluorspar were reported imported from Germany in 1926.

In 1926 the imports of fluorspar from Africa were a little more than in 1925. All of the fluorspar from this source is of acid grade and is used in the manufacture of hydrofluoric acid. Some of the fluorspar from Africa is said to have brought between $28 and $34 a short ton, duty paid, at tidewater.

In 1926 the imports of fluorspar from France—11,163 short tons—were nearly four and one-half times those of 1925 and reflect the increased operations of the newly opened mines in the Department of Var. Mineral Resources for 1925 (p. 22) contains some notes concerning these mines. They are 10 to 15 miles from the seacoast, and it was reported that a railroad to connect them with the coast was under construction in 1926. Except for a small quantity of fluorspar that was ground in the United States and sold for use in the glass industry and a few hundred tons that was sold to foundries, all of the fluorspar imported from France was sold for use in steel plants; the selling price ranged between $15.75 and $17.50 a short ton, duty paid, at tidewater. According to reports of importers of 10,418 short tons of French fluorspar which was sold to steel makers, the selling price of this quantity at tidewater, duty paid, averaged about $16.50 a short ton in 1926.

In 1926 importations of fluorspar from Spain were recorded for the first time; although the quantity was only 2,948 tons it gives promise of increasing. The imports from this source probably reflect the activities of the Berta mine, near Barcelona, which was reopened in 1925 and seemingly contains a large deposit of fluorspar. Some notes concerning this mine are given on pages 45 to 48.

The imports of fluorspar from Italy decreased from 4,278 short tons in 1925 to 1,379 tons in 1926. Most of this fluorspar was sold for use in steel plants, and the selling price averaged about $16.50 a short ton, duty paid, at tidewater. Ground fluorspar amounting to 440 short tons and containing 96 per cent or more of calcium fluoride and less than 2 per cent of silica was imported from Italy in 1926 and was sold to manufacturers of enameled and sanitary ware.

Although Canada is credited with exporting 1,109 short tons of fluorspar to the United States in 1926, the fluorspar apparently was not produced there but was probably imported into Canada from Europe and was reexported to the United States.

Chinese fluorspar was sold to steel manufacturers in California and Washington, and one shipment of 55 short tons was reported to have been sold to an eastern consumer for use in the manufacture of hydrofluoric acid.

The tariff act of 1922 increased the import duty on fluorspar from $1.50 a long ton ($1.34 a short ton) to $5.60 a long ton ($5 a short ton).

The distances that domestic fluorspar must be transported by rail from mines to steel plants in the Lehigh and Susquehanna Valleys of Pennsylvania are much greater than the distances that foreign fluorspar must be moved from the ports of entry to these plants; moreover, a large part of the imported material is carried as ballast, making possible a lower market price than would have to be charged if it were carried as a primary cargo. Except when ocean freight rates are moderate, however, foreign fluorspar can not compete readily in American markets, because it is not generally of such high grade as the mechanically cleaned domestic product. As the value of fluorspar depends mainly upon its purity, comparison of the American fluorspar with foreign fluorspar should be made not merely on the basis of price per ton but on the basis of quality as well.

Fluorspar imported into the United States, 1925–26, by countries

[General imports]

Country	1925			1926		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Africa:						
British South	7,906	$108,647	$13.74	7,534	$123,734	$16.42
British West				610	7,933	13.00
Portuguese East				362	4,835	13.36
Belgium	78	1,624	20.82	31	566	18.26
Canada				1,109	10,310	9.30
China	559	5,816	10.40	645	5,992	9.29
Czechoslovakia	27	591	21.89			
France	2,537	20,887	8.23	11,163	90,737	8.13
Germany	11,680	103,845	8.89	20,465	171,769	8.39
Italy	4,278	32,208	7.53	1,379	15,434	11.19
Soviet Russia in Asia				18	277	15.39
Spain				2,948	33,915	11.50
United Kingdom	21,635	195,229	9.02	29,407	281,735	9.58
	48,700	468,847	9.63	75,671	747,237	9.87

Producers of fluorspar reported exports in 1926 amounting to 2,132 short tons, valued at $34,915, or $16.38 a ton, as compared with 1,055 tons, valued at $17,574, or $16.66 a ton, in 1925. All of the exported fluorspar went to Canada in 1926.

Fluorspar reported by producers as exported from the United States, 1920–1926

Year	Short tons	Value		Year	Short tons	Value	
		Total	Average			Total	Average
1920	2,764	$65,475	$23.69	1924	617	$14,489	$23.48
1921				1925	1,055	17,574	16.66
1922	2,296	40,966	17.84	1926	2,132	34,915	16.38
1923	1,144	25,312	22.13				

USES OF FLUORSPAR

Fluorspar has many uses, but its most important use is in metallurgical industries, in which was used about 86 per cent of the total fluorspar consumed in the United States in 1926. Other large users are the ceramic industries, which used about 8 per cent of the total quantity consumed in 1926, and the chemical industries, which used more than 6 per cent of the total. A little fluorspar is used in optical instruments.

METALLURGICAL INDUSTRIES

Steel.—The bulk of the fluorspar mined in the United States and most of that imported is used in the steel industry, principally by manufacturers using the basic open-hearth process, in which it is added as a flux to the furnace charge. Fluorspar gives fluidity to the slag and facilitates the passage of objectionable impurities, such as sulphur and phosphorus, into the slag.

Although fluorspar is used at virtually all basic open-hearth steel plants, it is not used in all furnace heats. The addition of ore (hematite) to the furnace heats to eliminate carbon is said to make the use of fluorspar unnecessary, as in such heats the oxide of iron in the slag reacts to form a sufficiently fluid slag. When high-manganese pig iron is used, less fluorspar is needed than for ordinary pig iron. According to Smith,[3] the consumption of fluorspar was 12 per cent less in heats made with 1.5 to 2 per cent of manganese iron than in those made with 1 per cent and less.

The average quantity of fluorspar used by individual plants per ton of basic open-hearth steel made varies widely, usually ranging between 1 and 35 pounds. In general, the average is between 7 and 8 pounds, which is a very small proportion of the furnace charge. The following table shows the variation in average consumption of fluorspar per ton of basic open-hearth steel of certain manufacturers who make about 70 per cent of the total.

[3] Smith, A. W., "High-manganese iron possesses advantages": Daily Metal Trade, sec. 4, Oct. 23, 1926, p. 2.

Average consumption of fluorspar per ton of steel, 1921–1926, in pounds

1921	1922	1923	1924	1925	1926
18.644	18.476	16.176	19.295	13.983	12.959
4.843	7.113	8.973	7.409	7.893	8.219
7.633	6.552	6.416	6.857	6.224	5.700
9.578	8.804	7.780	5.365	4.809	6.270
7.086	5.308	5.799	5.383	4.568	4.313
9.224	7.051	6.475	7.652	9.090	11.225
11.578	9.331	9.880	8.747	8.656	8.541

Manufacturers of basic open-hearth steel generally require that fluorspar be in pieces that will pass through a 1-inch screen, the fines to be not more than 15 per cent of the total. However, variation in size requirements is not uncommon, and fluorspar in lumps several inches in diameter is sometimes used. Almost universally such manufacturers specify that fluorspar show by analysis not less than 85 per cent of calcium fluoride, not more than 5 per cent of silica, and not more than 0.3 per cent of sulphur.

Thus, as generally computed, one part of silica requires 2½ parts of fluorspar to flux it; a fluorspar containing 85 per cent of calcium fluoride and 5 per cent of silica would be equivalent to 72½ units of net calcium fluoride. With some manufacturers a sliding scale is acceptable, and for each 2½ units of calcium fluoride above 85 per cent the silica is allowed to go up 1 per cent. In other words, a fluorspar containing 87½ per cent of calcium fluoride and 6 per cent of silica is equivalent to one containing 85 per cent of calcium fluoride and 5 per cent of silica. As a rule, there are no guarantees on the other elements, but the consumer prefers the absolute minimum of the lead and zinc. However, fluorspar carrying as little as 80 per cent of calcium fluoride and 6 to 7 per cent of silica is occasionally used. Furthermore, some consumers do not object to a larger amount of sulphur.

Fluorspar is used to some extent in the manufacture of steel by the electric-furnace process, mainly in making alloy steels. The action of fluorspar in this process is similar to that on the slag in the basic open-hearth process, and generally fluorspar of the same grade is used. The quantity used per ton of steel made, however, is much larger, ranging from a few pounds to as much as 80 and averaging about 23 pounds.

Analyses of gravel fluorspar used in steel plants

CaF_2	SiO_2	$CaCO_3$	Fe_2O_3	Al_2O_3	S	$BaSO_4$
Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
87.50	4.00	7.20	0.60	0.55	0.12	----------
86.7	4.8	7.5	----------	----------	----------	----------
88.92	3.07	1.23	----------	1.96	----------	4.16
87.8	3.10	----------	3.06		----------	----------

Ferro-alloys.—To a small extent fluorspar is used as a flux in making ferro-alloys by the electric-furnace process. For this purpose a

fluorspar comparatively high in calcium fluoride and low in silica and fine enough to give good distribution is required.

Foundry.—Fluorspar is used for the same purpose in foundry practices as in the basic open-hearth steel process, and the requirements as to analyses are virtually the same. The cupolas are so constructed, however, that the fluorspar need not be in small sizes, as many users believe better results are obtained if fluorspar in lump form is used. Although there are several thousand foundries scattered throughout the United States, the total quantity of fluorspar consumed annually is small. Some foundries use it as standard practice and some use it only occasionally, but by far the greater number do not use fluorspar at any time.

The results of a series of investigations on the use of fluorspar in cupola practice have been recorded in Stahl und Eisen, an abstract of which recently appeared in the Iron Age.[4]

Analyses of fluorspar used in cupolas

CaF_2	SiO_2	$CaCO_3$
Per cent	*Per cent*	*Per cent*
87.0	4.5	7.5
88.5	4.3	6.0
92.0	3.5	3.67
82.0	8.0	1.3

Other metallurgical uses.—Small quantities of fluorspar are used in other metallurgical operations, the quality and size of fluorspar required depending on the particular use. For instance, in the production of nickel and monel metal a lump fluorspar high in calcium fluoride and absolutely free from lead is required. In reducing aluminum a ground fluorspar showing by analysis 98.5 per cent of calcium fluoride, 0.62 per cent of silica, and 0.74 per cent of calcium carbonate is generally used.

CERAMIC INDUSTRIES

Glass.—The chief consumers of fluorspar in the glass industry are manufacturers of opal or opaque glass and colored glasses, which are used for many purposes, such as for lamp globes, shades, and bulbs, soda fountains, liners for fruit jars, containers for toilet and medicinal preparations, bars and rods for lavatories, tableware, and novelties.

Fluorspar used in the glass industry is either packed in bags or barrels or shipped in bulk. It is generally ground so that approximately 55 per cent will pass a 100-mesh screen and approximately 15 per cent through a 200-mesh screen. Fluorspar used in the glass industry generally contains 95 per cent or more of calcium fluoride, not more than 3 per cent of silica, 1 per cent or less of calcium carbonate, and not more than 0.12 per cent of iron oxide.

The specifications of a large consumer of fluorspar in the glass industry follow, and with some variations are probably representative:

Our specifications call for a limit of 0.12 per cent iron oxide content. Really we would object strongly if we obtained much fluorspar with that much iron

[4] Iron Age. "Flourspar in cupola practice"; Apr. 7. 1927, pp. 997–998.

in it, as it colors the glass, and we have been receiving fluorspar from responsible sources around 0.06 per cent.

Calcium fluoride content has been placed at a minimum of 90 per cent. However, we receive most of it well above 95 per cent, and our price is based on that. If the diluting material is something such as silica which is used in the glass, it would not interfere with the process, but would with the price.

Calcium carbonate content must not vary too much, as it affects the formula used in the glass batch. We do not want lead, zinc, or sulphur, so this specification is not a usual one in the glass trade. We do this because we neutralize these materials rather accurately, and too much of them will give us an off shade in color.

All our material is bought in bulk and is finely ground, generally nearly 100 mesh. We can stand considerable variation in this.

Enamels.—Fluorspar is used as an ingredient in enamels for coating hospital and kitchen ware, plumbing fixtures, barber and beauty-parlor chairs, linings for refrigerators, table and counter tops, reflectors, signs, stove parts, facing for brick and tile, art pottery, structural materials, earthen cooking ware, and other similar products.

As in the glass industry, enamelers require a high-grade fluorspar, usually a product containing at least 95 per cent of calcium fluoride. A small amount of silica is not injurious, but as calcium carbonate tends to increase the brittleness of the enamel it must be kept as low as possible. Iron, lead, zinc, and sulphur are objectionable impurities, as these elements in any appreciable quantity would stain or color the enamel. The fluorspar is generally ground so that approximately 80 per cent will pass through a 100-mesh screen and 15 per cent through a 200-mesh screen.

Analyses of fluorspar used in the manufacture of glass and enamel

CaF_2	SiO_2	Fe_2O_3	Al_2O_3	$CaCO_3$	$MgCO_3$	S
Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
97.86	0.72	0.06	0.08	1.01	0.26	Trace.
97.403	1.55	.14	.26	.54	----------	0.027
97.54	.98	.50		.98	----------	----------
97.38	1.13	.28		1.21	----------	----------
98.53	.76	.34		.37	----------	----------
96.92	1.24	.88	----------	1.28	----------	----------
95.00	2.50	.12	----------	----------	----------	----------
97.15	1.60	.08	----------	.90	----------	----------

Cement.—Small quantities of fluorspar have been used in the recovery of potassium compounds from flue dust of cement works in the United States, but this saving of potash has now been discontinued. Fluorspar is used more or less in the manufacture of Portland cement abroad, but little is now used in this industry in the United States. In 1926 one shipment of fluorspar was reported made to a cement plant. According to an article in a recent publication,[5] the addition of fluorspar to the raw materials permits the lowering of the fusing point about 400°, thereby resulting in considerable economy in fuel. It is stated that the addition of only 0.25 to 1 per cent of fluorspar was the practice for some time, but recent experiments have shown that the addition of 3 to 5 per cent of fluorspar gives the best result. The clinker obtained in this way is very fragile, and grinding is therefore greatly facilitated, with an appreciable economy in power.

[5] Chermette, A., and Sire, L., "Le spath fluor dans le massif central. Ses applications" [Fluorspar in the central massif and its uses]: Rev. ind. min., No. 143, Dec. 1, 1926, Mem., pp. 515–528. Paris, 1926.

The addition of fluorspar is said to eliminate the formation of rings in the rotary kilns, which reduces to a minimum the periods of stoppage and increases the life of the refractory lining.

CHEMICAL INDUSTRIES

Hydrofluoric acid.—Fluorspar is the basic material used in the manufacture of hydrofluoric acid, which finds considerable use in the electrolytic refining of metals, the etching of glassware, and in the manufacture of fluorides used in various chemical processes, and for insecticides. The manufacture of hydrofluoric acid consists, essentially, of treating high-grade ground fluorspar with sulphuric acid.

The manufacture of hydrofluoric acid requires a finely ground fluorspar, generally ranging between 80 and 100 mesh. Most manufacturers of hydrofluoric acid, however, prefer the fluorspar either in the lump or gravel form and to grind the material in their own plants.

Moreover, the manufacture of hydrofluoric acid requires a high-grade fluorspar, manufacturers generally specifying a minimum of 98 per cent of calcium fluoride and a maximum of 1 per cent of silica. However, it is reported that a product containing as low as 97 per cent of calcium fluoride and as high as 1.5 per cent of silica can be used for this purpose, but such a fluorspar would not demand more than 85 per cent of the price of the higher-grade product. Less than 1 per cent of calcium carbonate is generally specified, as the presence of 1 per cent or more causes considerable foaming upon mixing.

An analysis of a shipment of "acid-grade" fluorspar from the Illinois-Kentucky field follows:

	Per cent		Per cent
CaF_2	99.07	Fe_2O_3–Al_2O_3	0.292
SiO_2	.24	CO_2	.15
CaO	.23	S	.018

Cyanamid and calcium carbide.—Fluorspar is used to facilitate the fusion and contact of products in the manufacture of calcium carbide and cyanamid; the carbide then flows more readily.[6]

OPTICAL FLUORSPAR

A comparatively small quantity of fluorspar is used for optical purposes. According to the Bureau of Standards,[7] fluorspar is useful in correcting the color and spherical aberration errors in lenses, especially for microscopes and small telescopes. Fluorspar suitable for optical instruments must be as clear as glass; that is, it must be free from cloudiness, inclusions, and cracks (incipient cleavage marks). Colorless material is most desired, but samples which are faintly tinged with yellow or green may be valuable.

CONSUMPTION—STOCKS AT CONSUMERS' PLANTS

The figures on consumption of fluorspar in 1926 and stocks at consumers' plants on December 31, 1926, given in the following table, are believed to fall not far short of the total for the United States.

[6] Chermette, A., and Sire, L., Op. cit. [7] Circular letter, dated May 8, 1918.

Thus, the figures for basic open-hearth steel represent all plants, including an estimate for two companies not reporting, and are based on reports of manufacturers who produced 99 per cent of the total. Similarly, all electric-steel and ferro-alloy manufacturers that use fluorspar are represented. The smaller foundries, some of which use a little fluorspar, were not canvassed, so that the figures for this industry are incomplete, as also are the figures for hydrofluoric acid, one manufacturer not reporting. The figures for the ceramic industry are believed to be practically complete.

Fluorspar reported consumed and in stock in the United States in 1926, by industries

Industry	Companies represented	Fluorspar consumed (short tons)	Stocks at consumers' plants Dec. 31 (short tons)
Basic open-hearth steel	75	142,000	70,000
Electric-furnace steel	61	4,800	2,000
Foundry	68	4,335	1,400
Ferro-alloys	5	462	180
Hydrofluoric acid	5	7,591	12,153
Enamel and sanitary ware	71	6,677	935
Glass	44	7,973	1,342
Miscellaneous	14	719	252
		174,557	88,262

The table that follows shows the relation of the consumption of fluorspar to the production of basic open-hearth steel for the 5-year period 1922 to 1926 and the stocks of fluorspar at such steel plants at the close of each of these years. The stocks at the close of 1926 are the largest recorded since such statistics have been collected by the Bureau of Mines.

Consumption and stocks of fluorspar at basic open-hearth steel plants, 1922–1926

	1922	1923	1924	1925	1926
Production of basic open-hearth steel ingots, long tons	28,387,171	34,665,021	30,719,523	37,087,342	39,653,315
Consumption of fluorspar in basic open-hearth steel production, short tons	105,000	140,000	119,800	137,700	142,000
Consumption of fluorspar per ton of steel made, pounds	7.4	8.1	7.8	7.4	7.2
Stocks of fluorspar on hand at steel plants at end of year, short tons	65,000	49,900	64,000	49,400	70,000

MARKETING

Prices of domestic fluorspar are quoted on the basis of the short ton (2,000 pounds) f. o. b. cars at the nearest shipping point to mills or mines. Gravel and lump fluorspar are generally shipped in bulk in open-top cars. Ground fluorspar is shipped both in bulk in box cars lined with heavy paper and packed in bags with a capacity of 125 pounds each or barrels with a capacity of from 450 to 500 pounds each. When packed in bags and barrels, a charge, depending

on the cost of the containers, is added. If the bags are in good condition, and the freight prepaid to the mine, they may be returned for repacking, in which case the usual allowance of 10 cents a bag is made. The barrels are not returnable.

Most of the large consumers buy the bulk of their fluorspar on contract, generally covering a definite tonnage to be delivered within a stated time and specifying the minimum content of calcium fluoride and the maximum contents of impurities that will be accepted. The contract may or may not include penalties for excesses of impurities above the specified limits. Premiums, however, are seldom paid for unusual purity.

Most of the domestic fluorspar of commerce is sold through established sales agencies, who handle other raw materials used in the iron, steel, ceramic, and chemical industries and are thus in close contact with the consumers. Such sales agencies either operate their own mines or have contracts with producers whereby the producer agrees to supply and the sales agency agrees to handle the entire output of the producer. Thus a producer who does not have selling connections and who is unable to guarantee a definite tonnage or to make delivery over a definite period finds it difficult to sell direct to consumers. In the Illinois-Kentucky district, however, the local mills provide a market for such producers.

MARKETS

The bulk of the fluorspar sold in the United States is used by basic open-hearth steel plants, which are scattered over 24 States and provide the chief markets for fluorspar. Most of these plants, however, are in the eastern part of the United States and are more or less centralized in certain well-known districts.

The largest single market for fluorspar in the East, as well as in the United States, is at basic open-hearth steel plants in the Pittsburgh district, Pennsylvania, which in 1926 consumed about 30,000 short tons of fluorspar, or about 21 per cent of the total consumed in the basic open-hearth steel industry.

The next largest markets in the East are in the Youngstown-Canton-Sharon and eastern Pennsylvania districts, which consumed about 17,000 tons each in 1926.

Other important markets are at Buffalo, N. Y.; Johnstown, Pa.; Cleveland and Steubenville, Ohio; Weirton, W. Va.; and at or near the Atlantic coast in Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, and Maryland. The total consumption of fluorspar in these districts amounted to about 30,000 tons in 1926.

Thus, the basic open-hearth steel plants at and east of Cleveland, Massillon, and Steubenville, Ohio, consumed about 94,000 tons of fluorspar in 1926, or about 66 per cent of the total consumed by basic open-hearth steel plants in the United States.

Costs of production and transportation limit the markets in which sellers of fluorspar can profitably compete; the import duty further limits the markets for imported fluorspar. The cost of producing fluorspar abroad, chiefly in England, Germany, and France, is relatively so much lower than the cost of production in the Illinois-Kentucky district that, notwithstanding a duty of $5 a short ton,

fluorspar imported from these sources is sold in western Pennsylvania and to a small extent in eastern Ohio in stiff competition with that from the Illinois-Kentucky district. The market in this area is therefore more or less divided between domestic and imported fluorspar.

As the cost of delivering fluorspar from abroad to the plants near the Atlantic coast in Pennsylvania, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, and Maryland, as well as at Buffalo, N. Y., is much less than the cost of delivering from the Illinois-Kentucky district, comparatively little domestic fluorspar is sold to basic open-hearth steel plants in this area.

In the mid-west the principal markets for fluorspar are at basic open-hearth steel plants at Chicago, Peoria, and Granite City, Ill.; Gary and Indiana Harbor, Ind.; St. Louis and Kansas City, Mo.; and Duluth, Minn. The total consumption in this area amounted to about 29,000 short tons in 1926. The largest market in this area and the second largest in the United States is the Chicago-Indiana Harbor-Gary district; the basic open-hearth steel plants in this district consumed about 25,000 short tons of fluorspar in 1926, or about 18 per cent of the total consumed in the basic open-hearth steel industry. The greater part of the fluorspar sold to steel plants in the mid-west comes from the Illinois-Kentucky district, although most of that produced in the Colorado-New Mexico district in 1926 was shipped to Chicago, Gary, Duluth, and Kansas City.

In the South important markets for fluorspar are in the Birmingham district, Alabama City, Ala., and Atlanta, Ga. Practically all of the fluorspar sold in this market is from the Illinois-Kentucky district.

In the West the largest consumer of fluorspar is the steelworks at Pueblo, Colo.; a mine owned by the operators of the steelworks supplies this plant with fluorspar, so that a market does not exist.

On the Pacific coast the largest consumers of fluorspar are the basic open-hearth steel plants near Los Angeles, San Francisco, Pittsburg, and Torrance, Calif., and Youngstown, Wash., but the quantity consumed annually is comparatively small and is supplied by the Colorado-New Mexico district and by imported fluorspar, chiefly from China and England.

In 1926 the total consumption of fluorspar at steel plants in the West was about 5,600 short tons.

The largest markets for fluorspar used in the glass industry are in Pennsylvania, Indiana, and West Virginia, the plants in these States using about 93 per cent of the total consumed in this industry in 1926. The largest markets in this area are at Washington, Pa.; Muncie, Ind.; and Fairmont, W. Va.

The markets for fluorspar used in making enamels, including vitrolite, are more widely distributed than in the glass industry; in 1926 about 80 per cent of the total was consumed in West Virginia, Pennsylvania, Wisconsin, Indiana, Illinois, and Ohio. The largest markets for fluorspar in this industry are at Parkersburg, W. Va.; Pittsburgh and New Brighton, Pa.; Kohler, Wis.; Noblesville and Indianapolis, Ind.; Chicago, Ill.; and Cuyahoga Heights, Cleveland, and Mansfield, Ohio.

Foundries offer small and widely scattered markets for fluorspar. Those using fluorspar are located chiefly in Illinois, New York, Michigan, Wisconsin, and Indiana.

The largest consumers of fluorspar in the chemical industry are at St. Louis, Mo.; Cleveland, Ohio; Newell, Pa.; Brooklyn, N. Y.; and Clayton, Del.

CONSUMERS OF FLUORSPAR

As the need of a directory of consumers of fluorspar in the United States has been felt for some time, an attempt has been made to list them. As will be seen from the following list, the consumers have been classified according to the industries in which fluorspar is used, and each industry has been arranged alphabetically by States and by location of the consuming plant. Where information was obtainable the address of the purchasing agent is given. Although the directory is not as complete as is desirable, it is believed that all of the larger consumers are included. Any additions or corrections that the reader may send to the Bureau of Mines will be appreciated.

Consumers of fluorspar in basic open-hearth steel plants in the United States

Name of consumer	Address of purchasing agent	Location of plant
Alabama:		
Gulf States Steel Co	Birmingham	Alabama City.
Tennessee Coal, Iron & Railroad Co	do	Ensley, Fairfield.
California:		
Southern California Iron & Steel Co	Huntington Park	Huntington Park.
Judson Manufacturing Co	San Francisco	Oakland.
Columbia Steel Corporation	do	Pittsburg, Torrance
Pacific Coast Steel Co	do	South San Francisco
Colorado: Colorado Fuel & Iron Co	Denver	Pueblo.
Connecticut: American Tube & Stamping Co	Bridgeport	Bridgeport.
Delaware:		
Worth Steel Co	Claymont	Claymont.
Penn Seaboard Steel Corporation	New Castle	New Castle.
Georgia: Atlantic Steel Co	Atlanta	Atlanta.
Illinois:		
Laclede Steel Co	St. Louis, Mo	Alton.
Railway Steel-Spring Co	New York, N. Y	Chicago Heights.
American Steel Foundries	Chicago	East St. Louis, Granite City.
Commonwealth Steel Co	St. Louis, Mo	Granite City.
National Enameling & Stamping Co	Granite City	Do.
National Malleable & Steel Castings Co	Cleveland, Ohio	Melrose Park.
Keystone Steel & Wire Co	Peoria	Peoria.
Illinois Steel Co	Chicago	South Chicago.
International Harvester Co	do	Do.
Interstate Iron & Steel Co	do	Do.
Indiana:		
Illinois Steel Co	Chicago, Ill	Gary.
Inland Steel Co	Indiana Harbor	Indiana Harbor.
Youngstown Sheet & Tube Co	Youngstown, Ohio	Do.
Kokomo Steel & Wire Co	Kokomo	Kokomo.
Iowa:		
Bettendorf Co	Bettendorf	Bettendorf.
Zimmerman Steel Co	do	Do.
Kentucky:		
American Rolling Mill Co	Middletown, Ohio	Ashland.
Andrews Steel Co	Newport	Newport.
Maryland: Bethlehem Steel Co	Bethlehem, Pa	Sparrows Point.
Massachusetts: American Steel & Wire Co	Cleveland, Ohio	Worcester.
Michigan: Ford Motor Co	Detroit	Springwells.
Minnesota: Minnesota Steel Co	Chicago, Ill	Duluth.
Missouri:		
Sheffield Steel Corp	Kansas City	Kansas City.
Scullin Steel Co	St. Louis	St. Louis.
New Jersey:		
Crucible Steel Co. of America	New York, N. Y	Harrison.
John A. Roebling's Sons Co	Trenton	Roebling.

Consumers of fluorspar in basic open-hearth steel plants in the United States—Continued

Name of consumer	Address of purchasing agent	Location of plant
New York:		
Donner Steel Co	Buffalo	Buffalo.
Wickwire Spencer Steel Co	New York	Do.
Wickwire Bros	Cortland	Cortland.
Gould Coupler Co	Depew	Depew.
Bethlehem Steel Co	Bethlehem, Pa	Lackawanna.
Ohio:		
American Steel Foundries	Chicago, Ill	Alliance.
Central Alloy Steel Corporation	Massillon	Canton, Columbia Heights.
American Steel & Wire Co	Cleveland	Cleveland.
Bourne-Fuller Co	do	Do.
Corrigan, McKinney Steel Co	do	Do.
Otis Steel Co	do	Do.
Ohio Steel Foundry Co	Lima	Lima.
National Tube Co	Pittsburgh, Pa	Lorain.
Sharon Steel Hoop Co	Sharon, Pa	Lowellville.
Mansfield Sheet & Tin Plate Co	Mansfield	Mansfield.
Marion Steam Shovel Co	Marion	Marion.
American Rolling Mill Co	Middletown	Middletown.
Crucible Steel Co. of America	New York, N. Y	Norwalk.
Jackson Valve & Manufacturing Co	Portsmouth	Portsmouth.
Wheeling Steel Corporation	Wheeling, W. Va	Portsmouth, Steubenville.
Bonney-Floyd Co	Columbus	South Columbus.
Buckeye Steel Castings Co	do	Do.
Follansbee Bros. Co	Pittsburgh, Pa	Toronto.
Trumbull Steel Co	Warren	Warren.
Carnegie Steel Co	Pittsburgh, Pa	Youngstown.
Republic Iron & Steel Co	Youngstown	Do.
Youngstown Sheet & Tube Co	do	Do.
Pennsylvania:		
Bethlehem Steel Co	Bethlehem	Bethlehem, Coatesville, Johnstown, Steelton.
Allegheny Steel Co	Brackenridge	Brackenridge.
West Penn Steel Co	do	Do.
Standard Steel Works Co	Philadelphia	Burnham.
Forged Steel Wheel Co	Pittsburgh	Butler.
Carnegie Steel Co	do	Clairton, Duquesne, Farrell, Munhall, North Braddock.
Lukens Steel Co	Coatesville	Coatesville.
Colonial Steel Co	Pittsburgh	Colona (Monaca).
American Steel & Wire Co	Cleveland, Ohio	Donora.
Erie Forge Co	Erie	Erie.
Erie Forge & Steel Co	do	Do.
Pittsburgh Steel Foundry Co	Pittsburgh	Glassport.
Central Iron & Steel Co	Harrisburg	Harrisburg.
Harrisburg Pipe & Pipe Bending Co	do	Do.
Alan Wood Iron & Steel Co	Philadelphia	Ivy Rock.
Firth-Sterling Steel Co	McKeesport	McKeesport.
Pittsburgh Crucible Steel Co	New York, N. Y	Midland.
Pittsburgh Steel Co	Pittsburgh	Monessen.
Midvale Co	Philadelphia	Nicetown.
Edgewater Steel Co	Oakmont	Oakmont.
American Bridge Co	Pittsburgh	Pencoyd.
Phoenix Iron Co	Philadelphia	Phoenixville.
Crucible Steel Co. of America	New York, N. Y	Pittsburgh.
Jones & Laughlin Steel Co	Pittsburgh	Pittsburgh, Woodlawn.
Eastern Steel Co	Pottsville	Pottsville.
American Steel Foundries	Chicago, Ill	Sharon.
National Malleable & Steel Castings Co	Cleveland, Ohio	Do.
American Sheet & Tin Plate Co	Pittsburgh	Vandergrift.
Verona Steel Castings Co	do	Verona.
Rhode Island: Washburn Wire Co	Phillipsdale	Phillipsdale.
Utah: Utah Steel Corporation	Midvale	Midvale.
Washington: Pacific Coast Steel Co	Seattle	Youngstown.
West Virginia:		
Follansbee Bros. Co	Pittsburgh, Pa	Follansbee.
Weirton Steel Co	Weirton	Weirton.
Wisconsin: Bucyrus Co	South Milwaukee	South Milwaukee.

Consumers of fluorspar in electric-furnace steel plants in the United States

Name of consumer	Address of purchasing agent	Location of plant
Alabama: Anniston Electric Steel Corporation	Anniston	Anniston.
California:		
Best Steel Casting Co	Oakland	Elmhurst.
Alloy Steel & Metals Co	Los Angeles	Los Angeles.
American Manganese Steel Co	Chicago, Ill	Los Angeles, Oakland.
Southern Pacific Railroad Co	San Francisco	Sacramento.
Columbia Steel Corporation	do	Torrance.
Union Tool Co	Torrance	Do.
Colorado: American Manganese Steel Co	Chicago, Ill	Denver.
Connecticut: Yale & Towne Manufacturing Co	Stamford	Stamford.
Delaware: American Manganese Steel Co	Chicago, Ill	New Castle.
District of Columbia: Naval gun factory	Washington	Washington.
Georgia: Glover Machine Works	Marietta	Marietta.
Illinois:		
Burnside Steel Co	Chicago	Chicago.
Crane Co	do	Do.
Pettibone Mulliken Co	do	Do.
Trojan Electric Steel Co	do	Do.
American Manganese Steel Co	do	Chicago Heights.
National Malleable & Steel Castings Co	Cleveland, Ohio	Cicero.
Illinois Steel Co	Chicago	South Chicago.
McCord & Co	West Pullman	West Pullman.
Indiana: Damascus Steel Casting Co	New Brighton, Pa	Hammond.
Kansas: Locomotive Finished Material Co	Atchison	Atchison.
Massachusetts:		
General Electric Co	Schenectady, N. Y	Lynn, Pittsfield.
Electric Steel Castings Co	Turner Falls	Turner Falls.
Watertown Arsenal	Watertown	Watertown.
Michigan:		
Clark Equipment Co	Buchanan	Buchanan.
Calumet & Hecla Consolidated Copper Co	Calumet	Calumet.
Missouri: Southern Manganese Steel Co	Chicago, Ill	St. Louis.
Nebraska: Omaha Steel Works	Omaha	Omaha.
New Jersey: Driver-Harris Co	Harrison	Harrison.
New York:		
Onondaga Steel Co	Syracuse	Dewitt.
Atlas Alloy Steel Corporation	Dunkirk	Dunkirk.
Simonds Saw & Steel Co	Lockport	Lockport.
General Electric Co	Schenectady	Schenectady.
Ludlum Steel Co	Watervliet	Watervliet.
Ohio:		
Hadfield-Penfield Steel Co	Bucyrus	Bucyrus.
Central Alloy Steel Corporation	Massillon	Canton.
Timken Roller Bearing Co	Canton	Do.
National Malleable & Steel Castings Co	Cleveland	Cleveland.
Marion Steam Shovel Co	Marion	Marion.
American Rolling Mill Co	Middletown	Middletown.
Allis-Chalmers Manufacturing Co	Milwaukee, Wis	Norwood.
Pennsylvania:		
Vulcan Crucible Steel Co	Aliquippa	Aliquippa.
Bethlehem Steel Co	Bethlehem	Bethlehem, Steelton
Allegheny Steel Co	Brackenridge	Brackenridge.
Braeburn Alloy Steel Corporation	Braeburn	Braeburn.
Universal Steel Co	Bridgeville	Bridgeville.
Union Electric Steel Corporation	Pittsburgh	Carnegie.
Colonial Steel Co	do	Colona (Monaca).
Walworth Co	Boston, Mass	Greenburg.
Latrobe Electric Steel Co	Latrobe	Latrobe.
Vanadium Alloys Steel Co	do	Do.
Firth-Sterling Steel Co	McKeesport	McKeesport.
Milton Manufacturing Co	Milton	Milton.
Le Moyne Steel Co	Pittsburgh	Monongahela.
Damascus Steel Casting Co	New Brighton	New Brighton.
Midvale Co	Philadelphia	Nicetown.
Henry Disston & Sons Iron & Steel Works	do	Philadelphia.
Philadelphia Navy Yard	do	Do.
Carpenter Steel Co	Reading	Reading.
Reading Steel Casting Co	do	Do.
National Malleable & Steel Castings Co	Cleveland, Ohio	Sharon.
Jessop Steel Co	Washington	Washington.
Texas: Hughes Tool Co	Houston	Houston.
Virginia:		
Old Dominion Iron & Steel Works	Richmond	Belle Isle (Richmond)
Newport News Shipbuilding & Dry Dock Co.	Norfolk	Norfolk.
Norfolk Navy Yard	do	Do.
Norfolk & Western Railway Co	Roanoke	Roanoke.

Consumers of fluorspar in electric-furnace steel plants in the United States—Con.

Name of consumer	Address of purchasing agent	Location of plant
Washington:		
Puget Sound Navy Yard	Bremerton	Bremerton.
Pacific Car & Foundry Co	Renton	Renton.
Washington Iron Works	Seattle	Seattle.
West Virginia:		
Duraloy Co	Pittsburgh, Pa	New Cumberland.
Ordnance Plant, Navy Department	South Charleston	South Charleston.
Wisconsin:		
Kinite Co	Milwaukee	Milwaukee.
Milwaukee Steel Foundry Co	do	Do.
Racine Steel Castings Co	Racine	Racine.

Consumers of fluorspar in the manufacture of ferro-alloys in the United States

Name of consumer	Address of purchasing agent	Location of plant
Iowa: Keokuk Electro-Metals Co	Keokuk	Keokuk.
New York:		
Electro Metallurgical Co	New York	Niagara Falls.
Vanadium Corporation of America	do	Do.
Pennsylvania:		
Vanadium Corporation of America	do	Bridgeville.
Molybdenum Corporation of America	Pittsburgh	Washington.
York Metal & Alloy Co	York	York.

Consumers of fluorspar in foundries and other metallurgical plants in the United States

Name of consumer	Address of purchasing agent	Location of plant
Alabama:		
American Cast Iron Pipe Co	Birmingham	Birmingham.
American Radiator Co	Buffalo, N. Y	Do.
Arkansas: Standard Brake Shoe & Foundry Co.	Pine Bluff	Pine Bluff.
California:		
P. J. Fasullo Foundry	Hanford	Hanford.
Kinney Iron Works	Los Angeles	Los Angeles.
Barth Foundry & Machine Co	San Diego	San Diego.
Amalgamated Metals Corporation	San Francisco	San Franscisco.
Colorado: C. S. Card Iron Works Co	Denver	Denver.
Connecticut:		
Crane Co	Bridgeport	Bridgeport.
North & Judd Manufacturing Co	New Britain	New Britain.
Waterbury Manufacturing Co	Waterbury	Waterbury.
Illinois:		
Apex Smelting Co	Chicago	Chicago.
Crane Co	do	Do.
Goldsmith Bros. Smelting & Refining Co	do	Do.
Great Western Smelting & Refining Co	do	Do.
Pyott Foundry Co	do	Do.
Aluminum Manufacturing Co	East Moline	East Moline.
Moore Bros. Co	Joliet	Joliet.
Walworth Co	Boston, Mass	Kewanee.
American Radiator Co	Buffalo, N. Y	Litchfield.
H. W. Clark Co	Mattoon	Mattoon.
Dayton Dowd Co	Quincy	Quincy.
Emerson-Brantingham Corporation	Rockford	Rockford.
Indiana:		
R W G Foundry Co	Anderson	Anderson.
McQuay-Norris Manufacturing Co	St. Louis, Mo	Connersville.
New York Central Railroad	Cleveland, Ohio	Elkhart.
Crescent Stove Works	Evansville	Evansville.
S. F. Bowser & Co	Fort Wayne	Fort Wayne.
American Foundry Co	Indianapolis	Indianapolis.
Indianapolis Castings Co	do	Do.
Globe Stove & Range Co	Kokomo	Kokomo.
Machinists Foundry Co	Muncie	Muncie.
Oliver Chilled Plow Works	South Bend	South Bend.
South Bend Foundry Co	do	Do.

Consumers of fluorspar in foundries and other metallurgical plants in the nited States—Continued

Name of consumer	Address of purchasing agent	Location of plant
Iowa: Maytag Co	Chicago, Ill	Newton.
Massachusetts:		
Richards Co	Boston	Malden.
Saco-Lowell Shops	Newton Upper Falls	Newton Upper Falls.
Gilbert & Barker Manufacturing Co	Springfield	Springfield.
Michigan:		
American Radiator Co	Buffalo, N. Y	Detroit.
Cadillac Motor Car Co	Detroit	Do.
Detroit Sanitary Manufacturing Co	do	Do.
Michigan Smelting & Refining Co	do	Do.
Packard Motor Car Co	do	Do.
D. J. Ryan Foundry Co	do	Ecorse.
Buick Motor Co	Flint	Flint.
Ford Motor Co	Detroit	Fordson.
Rempis & Gallmeyer Foundry Co	Grand Rapids	Grand Rapids.
Dodge Bros	Detroit	Hamtramck.
Campbell, Wyant & Cannon Foundry Co	Muskegon	Muskegon.
Piston Ring Co	do	Do.
Wilson Foundry & Machine Co	Pontiac	Pontiac.
Great Lakes Foundry Co	Port Huron	Port Huron.
Whitehead & Kales Co	Detroit	River Rouge.
Saginaw Products Co	Saginaw	Saginaw.
Sparta Foundry Co	Sparta	Sparta.
Ypsilanti Foundry Co	Ypsilanti	Ypsilanti.
Minnesota:		
American Brake Shoe & Foundry Co	Minneapolis	Minneapolis.
American Radiator Co	Buffalo, N. Y	St. Paul.
Missouri:		
St. Mary's Oil Engine Co	St. Charles	St. Charles.
McQuay-Norris Manufacturing Co	St. Louis	St. Louis.
New Jersey:		
American Radiator Co	Buffalo, N. Y	Bayonne.
Cox & Sons Co	Bridgeton	Bridgeton.
United States Metals Refining Co	Carteret	Carteret.
Moore Bros. Co	Elizabeth	Elizabeth.
Driver-Harris Co	Harrison	Harrison.
Eagle Iron & Brass Foundry Co	Passaic	Passaic.
New York:		
Fairbanks Co	Binghamton	Binghamton.
American Radiator Co	Buffalo	Black Rock (Buffalo).
Brooklyn Vault Light Co	Brooklyn	Brooklyn.
Cajan Foundry Co	do	Do.
Keystone Foundry Co	do	Do.
Niagara Falls Smelting & Refining Corporation.	Buffalo	Buffalo.
North Buffalo Hardware Co	do	Do.
Standard Foundry Co	do	Do.
Kennedy Valve Manufacturing Co	Elmira	Elmira.
Aluminum Co. of America	Pittsburgh, Pa	Massena, Niagara Falls.
General Electric Co	Schenectady	Schenectady.
Ohio:		
Era Steel Co	Bucyrus	Bucyrus.
G. A. Gray Co	Cincinnati	Cincinnati.
Consolidated Castings Co	Cleveland	Cleveland.
Euclid Foundry Co	do	Do.
Kilby Manufacturing Co	do	Do.
Standard Brass Foundry Co	do	Do.
Fox Furnace Co	Elyria	Elyria.
C. & G. Cooper Co	Mount Vernon	Mount Vernon.
Jackson Valve & Manufacturing Co	Portsmouth	Portsmouth.
Toledo Machine & Tool Co	Toledo	Toledo.
Pennsylvania:		
American Mond Nickel Co	Clearfield	Clearfield.
Hays Manufacturing Co	Erie	Erie.
Walworth Co	Boston, Mass	Greenburg.
Philadelphia Hardware & Malleable Iron Works.	Philadelphia	Philadelphia.
Frick Co	Waynesboro	Waynesboro.
Westinghouse Air Brake Co	Wilmerding	Wilmerding.
Rhode Island: Builders Iron Foundry	Providence	Providence.
South Dakota: Homestake Mining Co	Lead	Lead.
Tennessee:		
Aluminum Co. of America	Pittsburgh, Pa	Alcoa.
Crane Enamelware Co	Chattanooga	Chattanooga.
Washington: Salmon Bay Foundry Co	Seattle	Seattle.
West Virginia: International Nickel Co	New York, N. Y	Huntington.
Wisconsin:		
Kohler Co	Kohler	Kohler.
Nortmann Duffke Co	Milwaukee	Milwaukee.
Wisconsin Grey Iron Foundry Co	do	Do.
Liberty Foundry	Wauwatosa	Wauwatosa.

Consumers of fluorspar in the manufacture of glass in the United States

Name of consumer	Address of purchasing agent	Location of plant
Illinois:		
Inland Glass Co	Chicago	Clearing (Chicago).
Ball Bros. Glass Manufacturing Co	Muncie, Ind	Hillsboro.
Peltier Glass Co	Ottawa	Ottawa.
Indiana:		
Sneath Glass Co	Hartford City	Hartford City.
Kokomo Opalescent Glass Co	Kokomo	Kokomo.
Wells Glass Co	do	Do.
Canton Glass Co	Marion	Marion.
Macbeth-Evans Glass Co	Charleroi, Pa	Do.
Ball Bros. Glass Manufacturing Co	Muncie	Muncie.
New Jersey:		
Variety Glass Products Co	Clifton	Clifton.
Whitall Tatum Co	Philadelphia, Pa	Millville.
Kimble Glass Co	Vineland	Vineland.
New York:		
Dannenhoffer Glass Works	Brooklyn	Brooklyn.
Demuth Glass Manufacturing Co	do	Do.
Greiner Glass Co	Flushing	Do.
Williamsburg Flint Glass Co	New York	Do.
Gleason-Tiebout Glass Co	Brooklyn	Brooklyn, Maspeth.
Corning Glass Works	Corning	Corning.
Louis C. Tiffany Furnaces	Corona	Corona.
Gillinder Brothers	Port Jervis	Port Jervis.
Ohio:		
Imperial Glass Co	Bellaire	Bellaire.
Rodefer Glass Co	do	Do.
Cambridge Glass Co	Cambridge	Cambridge.
Lancaster Glass Co	Lancaster	Lancaster.
Advance Glass Co	Newark	Newark.
O klahoma:		
Okla Glass Co	Ada	Ada.
A. K. Kerrb& Co	Sand Springs	Sand Springs.
Kerr, Hubard & Kelly	do	Do.
Pennsylvania:		
Cooperative Flint Glass Co	Beaver Falls	Beaver Falls.
Macbeth-Evans Glass Co	Charleroi	Charleroi.
Consolidated Lamp & Glass Co	Coraopolis	Coraopolis.
Jeannette Shade & Novelty Co	Jeannette	Jeannette.
Phoenix Glass Co	Pittsburgh	Monaca.
Point Marion Glass Novelty Co	Guyaux	Nilan.
Gill Glass Co	Philadelphia	Philadelphia.
L. J. House Convex Glass Co	Point Marion	Point Marion.
H. C. Fry Glass Co	Rochester	Rochester.
Gillinder & Sons	Philadelphia	Tacony (Philadelphia).
Hazel-Atlas Glass Co	Wheeling, W. Va	Washington.
Highland Glass Co	Washington	Do.
Texas: Ball Bros. Glass Manufacturing Co	Muncie, Ind	Wichita Falls.
West Virginia:		
Akro Agate Co	Clarksburg	Clarksburg.
Columbia Glass Co	Fairmont	Fairmont.
Monongah Glass Co	do	Do.
Jefferson Glass Co	Follansbee	Follansbee.
Beaumont Co	Morgantown	Morgantown.
New Martinsville Glass Co	New Martinsville	New Martinsville.
Paul Wissmach Glass Co	Paden City	Paden City.
Marion Glass Co	Shinnston	Shinnston.
Sinclair Glass Co	Van Voorhis	Van Voorhis.

Consumers of fluorspar in the manufacture of enamel, vitrolite, and glazes in the United States

Name of consumer	Address of purchasing agent	Location of plant
California:		
Smoot-Holman Co	Inglewood	Inglewood.
California Metal Enameling Co	Los Angeles	Los Angeles.
Washington Iron Works	do	Do.
Whiting-Mead Co	do	Do.
Standard Sanitary Manufacturing Co	Pittsburgh, Pa	Richmond.
Connecticut: New England Enameling Co	Middletown	Middletown.
Illinois:		
Cribben & Sexton Co	Chicago	Chicago.
Federal Electric Co	do	Do.
General Porcelain Enameling & Manufacturing Co.	do	Do.
Theo. A. Kochs Co	do	Do.
Wolff Manufacturing Co	do	Do.
Chicago Vitreous Enamel Products Co	Cicero	Cicero.
Coonley Manufacturing Co	do	Do.
Crown Stove Works	Chicago	Do.
Benjamin Electric Manufacturing Co	Des Plaines	Des Plaines.
National Enameling & Stamping Co	Granite City	Granite City.
Sprague Sells Corporation	Hoopeston	Hoopeston.
Tiffany Enameled Brick Co	Momence	Momence.
Chicago Hardware & Foundry Co	North Chicago	North Chicago.
Indiana:		
Marietta Manufacturing Co	Indianapolis	Indianapolis.
Union Sanitary Works	Noblesville	Noblesville.
Columbian Enameling & Stamping Co	Terre Haute	Terre Haute.
Kentucky:		
Columbia Sanitary Manufacturing Co	Louisville	Louisville.
Standard Sanitary Manufacturing Co	Pittsburgh, Pa	Do.
Maryland:		
Baltimore Enamel & Novelty Co	Baltimore	Baltimore.
Jones Hollow Ware Co	do	Do.
Porcelain Enamel & Manufacturing Co	do	Do.
Standard Sanitary Manufacturing Co	Pittsburgh, Pa	Do.
A. Weiskittel & Co	Baltimore	Do.
Massachusetts: General Electric Co	Schenectady, N. Y	Lynn.
Michigan:		
A-B Stove Co	Battle Creek	Battle Creek.
Detroit-Michigan Stove Co	Detroit	Detroit.
Grand Rapids Refrigerator Co	Grand Rapids	Grand Rapids.
Michigan Enameling Works	Kalamazoo	Kalamazoo.
Minnesota: Seeger Refrigerator Co	St. Paul	St. Paul.
Missouri:		
Bridge & Beach Manufacturing Co	St. Louis	St. Louis.
Buck Stove & Range Co	do	Do.
New Jersey:		
Ingram-Richardson Corporation	Bayonne	Bayonne.
Central Stamping Co	Newark	Newark.
Kohler Co	Kohler, Wis	Trenton.
J. L. Mott Co	Trenton	Do.
Sneyd Enameled Brick Co	do	Do.
New York:		
Buffalo Pottery	Buffalo	Buffalo.
Republic Metal Ware Co	do	Do.
Lisk Manufacturing Co	Canandaigua	Canandaigua.
Vitreous Enameling & Stamping Co	New York	New York.
Pfaudler Co	Rochester	Rochester.
General Electric Co	Schenectady	Schenectady.
Robineau Pottery	Syracuse	Syracuse.
Lalance & Grosjean Manufacturing Co	New York	Woodhaven.
Ohio:		
Bellaire Enamel Co	Bellaire	Bellaire.
Oxford Pottery Co	Cambridge	Cambridge.
Republic Stamping & Enameling Co	Canton	Canton.
Limberg Enameling Works	Cincinnati	Cincinnati.
American Stove Co	St. Louis, Mo	Cleveland.
Enamel Products Co	Cleveland	Do.
Perfection Stove Co	do	Do.
Vitreous Enameling Co	do	Do.
D. A. Ebinger Sanitary Manufacturing Co	Columbus	Columbus.
Beach Enameling Co	Coshocton	Coshocton.
Ferro Enameling Co	Cleveland	Cuyahoga Heights.
Pfaudler Co	Rochester, N. Y	Elyria.
Barnes Manufacturing Co	Mansfield	Mansfield.
Humphryes Manufacturing Co	do	Do.
American Stamping & Enameling Co	Massillon	Massillon.
Belmont Stamping & Enameling Co	New Philadelphia	New Philadelphia.
Portsmouth Stove & Range Co	Portsmouth	Portsmouth.
National Sanitary Co	Salem	Salem.
Roseville Pottery Co	Zanesville	Zanesville.
S. A. Weller Co	do	Do.

Consumers of fluorspar in the manufacture of enamel, vitrolite, and glazes in the United States—Continued

Name of consumer	Address of purchasing agent	Location of plant
Pennsylvania:		
John Dunlap Co	Pittsburgh	Carnegie.
American Specialty Stamping Co	Johnstown	Johnstown.
Marietta Hollow Ware & Enameling Co	Marietta	Marietta.
United States Sanitary Manufacturing Co	Pittsburgh	Monaca.
Standard Sanitary Manufacturing Co	do	New Brighton, Pittsburgh.
Vitro Manufacturing Co	do	Pittsburgh.
Prizer-Painter Stove Co	Reading	Reading.
Richmond Radiator Co	Uniontown	Uniontown.
Iron City Sanitary Manufacturing Co	Pittsburgh	Zelienople.
Tennessee: Crane Enamelware Co	Chattanooga	Chattanooga.
West Virginia:		
Fletcher Enamel Co	Charleston	Dunbar.
Wheeling Sanitary Manufacturing Co	Wheeling	Elm Grove.
United States Stamping Co	Moundsville	Moundsville.
Vitrolite Co	Chicago, Ill	Parkersburg.
Wisconsin:		
Malleable Iron Range Co	Beaver Dam	Beaver Dam.
Kohler Co	Kohler	Kohler.
Geuder, Paeschke & Frey Co	Milwaukee	Milwaukee.
Rundle Manufacturing Co	do	Do.
Polar Ware Co	Sheboygan	Sheboygan.
Vollrath Co	do	Do.

Consumers of fluorspar in the manufacture of chemicals in the United States

Name of consumer	Address of purchasing agent	Location of plant
Illinois: Aluminum Ore Co	Pittsburgh, Pa	East St. Louis.
Indiana: U. S. S. Lead Refinery	New York, N. Y	East Chicago.
Nebraska: American Smelting & Refining Co	do	Omaha.
New York: John C. Wiarda & Co	Brooklyn	Brooklyn.
Ohio: Harshaw Fuller & Goodwin Co	Cleveland	Cleveland.
Pennsylvania: General Chemical Co	New York, N. Y	Marcus Hook and Newell.

CONDITIONS IN FOREIGN COUNTRIES

CANADA [8]

The renewed activity in the fluorspar industry in Canada, which was apparent in 1925, was not sustained in 1926. No shipments of fluorspar were reported from Canadian deposits during 1926. In the preceding 12 months production amounted to 3,886 short tons, valued at $19,234 and consisted principally of shipments from the Rock Candy mine and mill at Lynch Creek, British Columbia.

Fluorspar importations continue to increase; in 1926 imports amounting to 9,968 tons, worth $97,482, were shipped in from foreign countries. Customs' records showed 5,111 tons, appraised at $60,458, imported into Canada in 1925.

SPAIN

As fluorspar is imported from Spain into the United States, a report on the fluorspar industry in Spain by Hester [9] and another

[8] Dominion Bureau Statistics, "Preliminary production of Canada during the calendar year 1926," Ottawa, 1927.

[9] Hester E. D., assistant commercial attaché, American Embassy, Madrid, Spain, Mineral Production in Spain—Fluorspar: Report dated Jan. 22, 1927.

by Henry,[10] which discusses the Berta mine, are of interest. The information concerning the Berta mine was obtained chiefly from representatives of the mine by Henry, who visited the mine and who states that from the viewpoint of a nontechnical observer the statements made by the representatives appear to be justified. A summary of the reports by Hester and Henry follows.

The consumption of fluorspar in Spain up to the present has been very small, and although it promises to increase it will probably not be sufficient to support even a single mining enterprise of much size for years to come. A few tons are used annually by the glass industry; the iron and steel industry at Sagunto now uses about 100 tons a month, and it is thought there is a potential demand from the copper industry of Huelva Province and from the iron and steel plants of Bilbao. At the best, demand is not likely to exceed a few hundred tons monthly for a long time.

Until sometime in 1923 the production of fluorspar was limited to the Province of Guipuzcoa, where two mines, the San Maximiliano and Brillante, located at Irun, were in operation. The San Maximiliano mine has been producing almost continuously since 1907; up to 1917 it had yielded more fluorspar than lead, but since 1917 lead has been the principal mineral (5,000 to 7,000 tons annually since 1920) and the production of fluorspar is distinctly a by-product.

The Brillante mine is worked mainly for lead, but some fluorspar is obtained as a by-product. The production of fluorspar from this mine ceased in 1919–20, whether through exhaustion of the deposits or through attention being confined to lead production is not known.

A quarry known as La Collada, located near Siero, Province of Oviedo, was opened in 1924. The entire output of this quarry in 1924 was exported, but the output for 1925 was consumed in steel and iron plants on the north coast of Spain.

The Berta mine, situated at Papiol, Province of Barcelona, which was developed some years ago in the hope that it would become a lead producer, was reopened during 1925 for the purpose of recovering fluorspar.

The Jorna mine, at Murelaga, Province of Vizcaya, is said to have produced a small quantity of fluorspar in 1926 which was sold for local metallurgical use. The capacity of the Jorna mine is reported to be 5 tons a day.

A number of other deposits are reported in Spain, especially in the Provinces of Huesca, Ciudad Real, and Córdoba. Most of these contain objectionable impurities and are geographically too remote for profitable exploitation. In the Province of Córdoba fluorspar appears as an accessory mineral associated with certain lodes in different places at Cerro Muriano, where it is possible to obtain small particles of fluorspar from old diggings. However, about 8 kilometers (5 miles) from Fuente Obejuna, and in the vicinity of Peñarroya larger deposits of green and violet fluorspar occur. As these deposits are exposed, their exploitation should be comparatively easy and profitable.

The Berta mine is situated in the Province of Barcelona at Papiol, about 12 miles distant from the port of Barcelona. The deposit,

[10] Henry, F. A., American consul, Barcelona, Spain, "Fluorspar Deposits at Papiol, Near Barcelona, Spain"; Consular report dated Apr. 30, 1926.

which is in a hill, is developed by a number of drifts, and seemingly has been extensively stoped. A number of years ago the property was equipped and electrified at a cost of 4,000,000 pesetas,[11] but the mine was flooded and lead production was abandoned. During 1925 it was reopened in a small way for the purpose of extracting fluorspar, of which there seems to be a very large quantity.

In the mine seven known veins, each about 2 meters (6.6 feet) thick, 600 meters (1,969 feet) long, and 200 meters (656 feet) deep, have been exploited and have been estimated to contain 5,000,000 tons of ore. The latest workings are reported to show veins of greater length and thickness, so that it is believed that the quantity of ore available is much greater than estimated. Six horizontal adits have been driven, allowing easy access to the veins, from which the ore is mined by picks and electric drills and is brought to the surface in hand-pushed cars on light rails. As the mine is wired, electric haulage can be had with a small additional expenditure. The mine is opened on several levels, and the total workings measure more than 3 miles in length. They average 3 meters (9.8 feet) in height and 2 meters (6.6 feet) in width.

The ore contains some lead, but the quantity varies greatly in different parts of the mine, ranging from traces to a considerable percentage. The largest lead bearing veins, however, are in the lower levels which are flooded with water. Usually a more or less clean separation of lead can be made by hand picking. Some ore is coarsely crushed and the lead and fluorspar separated by washing.

The owners estimate that with the present installation from 5,000 to 10,000 tons of fluorspar can be extracted monthly. The mill has a capacity of 150 tons per 8 hours, so that by working three shifts 450 tons per day can be crushed and concentrated.

About 50 men are now employed in the mine. Wages vary from 8 pesetas ($1.19) for miners to 15 pesetas ($2.23) for foremen per 8-hour day.

The fluorspar found in the Berta mine is usually greenish, semitransparent, and averages 94 to 98 per cent of calcium fluoride, 0.15 to 4 per cent of silica, and a very small amount of sulphur. It also carries small quantities of carbonate of lime and silicates of iron and aluminum. Analyses of two samples, made in Barcelona in September, 1925, showed the following:

	Green color	White-rose color
	Per cent	*Per cent*
Calcium fluoride	98.60	94.40
Silica	.15	3.20
Sulphur	.02	.04

The mine appears to be favorably situated with regard to transportation. The ore is hauled 1 to 2 miles by motor truck to the nearest railroad station, where it is loaded on cars and carried to

[11] The average rate of exchange in 1926, as compiled by the Federal Reserve Board, was 1 peseta equals 14.8959 cents, which conversion factor is used throughout this discussion. The value of the peseta has fluctuated, and the value in 1926 can not safely be applied to a former year.

the wharf. Total transportation costs from mine mouth to wharf are at present about 15 pesetas ($2.23) per ton, but these could probably be lowered by a large output, particularly if the output justified the construction of a railway spur to the mine itself. Transportation to the United States appears to present few difficulties, as ample tonnage is always available for westbound cargo, which normally is very small. It is understood that freight offers of 16 pesetas ($2.38) per ton have been made, and that possibly even a lower rate could be obtained.

The cost of production is reported to be about 35 pesetas (about $5.21) per ton at the mine mouth, and c. i. f. costs at United States seaboard are estimated in the neighborhood of 66 to 70 pesetas ($9.83 to $10.43) a ton.

From the standpoint of the shipper development of trade with the United States would be desirable, as there is a shortage of westbound cargo, and the shipment of regular quantities of ore from Barcelona might make possible an opposite movement of some bulk cargo such as coal.

PRODUCTION, BY COUNTRIES

The following table was compiled by L. M. Jones, of the Bureau of Mines, from official sources so far as possible.

Production of fluorspar, 1922–1926, by countries, in metric tons

Country	1922	1923	1924	1925	1926
Australia:					
New South Wales			478		(1)
Queensland			1,894	4,295	2,348
Canada	4,085	126	69	3,525	
France	9,251	12,913	23,047	24,423	(1)
Germany:[2]					
Bavaria	13,221	10,543	21,663	31,454	(1)
Prussia	8,630	10,810	13,078	24,101	(1)
Saxony	8,509	5,761	9,032	16,141	(1)
Great Britain	33,878	49,818	50,286	39,706	(1)
Italy	1,395	3,362	6,831	7,770	5,800
Japan	36				(1)
Mexico[3]	500	500	500	500	500
Spain	392		4,474	2,436	(1)
Union of South Africa	(1)	10,975	10,192	4,883	(1)
United States	128,453	109,939	113,378	103,118	116,715

[1] Figures not available.
[2] In addition to the German states listed, fluorspar is produced in Baden and Thuringia, but data of output are not available.
[3] Estimated annual output.

CRYOLITE

Cryolite occurs in commercial quantities and is mined at only one place—Ivigtut, Greenland. Formerly two-thirds of the product was sold to the Pennsylvania Salt Co. and the other third went to Copenhagen, but at present these relative proportions are reversed. Of the cryolite shipped to the United States, the greater part is now used as a flux in the metallurgy of aluminum and for making opaque glass. In aluminum metallurgy in this country the mineral is being supplanted by artificial cryolite.

An article on the cryolite mine at Ivigtut has recently been published.[12] It discusses the discovery, exploitation, and mining of cryolite and describes the geology and mineralogy of the deposit.

The imports of cryolite into the United States in 1926, according to the Bureau of Foreign and Domestic Commerce, amounted to 7,599 long tons, valued at $557,598, or $73.38 a ton, compared with 9,844 long tons, valued at $690,651, or $70.16 a ton, in 1925.

[12] Gordon, S. G., "Mining cryolite in Greenland": Eng. and Min. Jour.-Press, vol. 121, Feb. 6, 1926, pp. 236–240.

ASPHALT AND RELATED BITUMENS

By G. R. Hopkins [1]

INTRODUCTION

The term "asphalt" is commonly used to denote the various forms of bitumen found in nature or produced by refining. As used here, the term includes: (1) Petroleum asphalt, obtained in the refining of oils of an asphaltic base or a mixed asphaltic and paraffin base; (2) native asphalt, which in the United States is generally associated with mineral matter, such as limestone or sandstone, and is usually called bituminous rock; (3) the "related bitumens"—a series of natural hydrocarbons, of which only gilsonite, grahamite, ozokerite, and wurtzilite are of commercial importance. Very little asphalt occurs in the United States as exudations or deposits such as those at Trinidad Lake in Trinidad and Bermudez Lake in Venezuela, although most of the asphalt imported is of this character. Tables showing the classification and characteristics of the entire group of bituminous substances are given on pages 64 to 67.

GENERAL STATEMENT

Sales of native asphalt and related bitumens, including bituminous rock, gilsonite, and wurtzilite (elaterite), at mines in the United States in 1926 amounted to 715,180 short tons, an increase of 22 per cent over 1925. The sales were valued at $4,484,960, or an average of $6.27 per ton, an increase of 8 per cent in total value but a decrease in average value of $0.82 per ton.

Sales of asphalt and asphaltic materials manufactured from petroleum at refineries in the United States during 1926 amounted to 3,458,470 short tons, an increase of 9 per cent over 1925. Of the total sales in 1926, 1,245,160 tons, or 36 per cent, was reported produced from domestic crude petroleum and 2,213,310 tons, or 64 per cent, from foreign crude petroleum. The average value per ton of the total sales was virtually the same as in 1925; the decrease in the value of asphalt from domestic crude petroleum was counterbalanced by an increase in value of asphalt from foreign crude petroleum. The increase in the proportion of sales of asphalt from foreign petroleum of 1926 over 1925 indicates a tendency for the asphalt manufacturers to place more and more dependence on Mexican and Venezuelan crudes. The geographical distribution of petroleum asphalt production was unchanged in 1926—the Atlantic seaboard led in sales and the Gulf coast and California followed.

[1] The statistics in this report on the domestic industry were prepared by Miss A. B. Coons, and the data on imports and exports were compiled from records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, both of the Bureau of Mines.

Asphalt sold by producers at mines or refineries in the United States, 1917–1926

[Value f. o. b. mine or refinery]

Year	Native asphalt and related bitumens		Manufactured asphalt					
			From domestic petroleum		From foreign petroleum		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	81,604	$773,424	701,809	$7,734,691	645,613	$7,441,813	1,347,422	$15,176,504
1918	60,034	780,808	604,723	8,796,541	597,697	9,417,818	1,202,420	18,214,359
1919	88,281	682,989	614,692	8,727,372	674,876	7,711,510	1,289,568	16,438,882
1920	198,497	1,213,908	700,496	11,985,457	1,045,779	14,272,862	1,746,275	26,258,319
1921	296,412	1,985,583	624,220	9,048,221	908,093	11,761,358	1,532,313	20,809,579
1922	327,792	2,253,180	805,145	10,385,925	1,242,163	13,899,407	2,047,308	24,285,332
1923	400,236	2,885,631	995,654	13,060,174	1,378,722	16,840,045	2,374,376	29,900,219
1924	562,367	3,958,339	1,158,456	14,305,007	1,920,915	21,710,793	3,079,371	36,015,800
1925	584,850	4,148,400	1,206,700	15,305,760	1,971,670	27,520,010	3,178,370	42,825,770
1926	715,180	4,484,960	1,245,160	15,452,940	2,213,310	31,098,460	3,458,470	46,551,400

Imports of native asphalt and bituminous rock into the United States during 1926 amounted to 142,632 short tons, an increase over 1925 of 20,470 tons, or 17 per cent. Of this amount Trinidad and Tobago shipped 76,562 tons, or 54 per cent, a slight decrease from 1925, and Venezuela 46,292 tons, or 32 per cent, a gain over 1925, as the result of much development work at the Bermudez Lake deposits. No imports of petroleum asphalt have yet been reported. Exports of asphalt are divided into three classes: Petroleum asphalt; native asphalt and bitumen, unmanufactured; and manufactures of native asphalt. Exports of petroleum asphalt increased 65 per cent over 1925, reflecting the growing output at refineries. The total amounted to 146,589 short tons, valued at $3,183,746. Exports of unmanufactured native asphalt in 1926 amounted to 38,218 short tons, an increase of 16 per cent over the previous year. Exports of manufactured native asphalt declined materially in value from 1925 despite an increase in exports of roofing squares.

NATIVE ASPHALTS AND BITUMENS

BITUMINOUS ROCK

The term "bituminous rock" is used to designate all kinds of rock, whether in a friable or solid state, that contain an appreciable quantity of bitumen or asphalt intermingled with the stony particles. Bituminous rock therefore includes asphaltic earth, sand, sandstone, shale, and limestone, of which asphaltic sandstones and limestones are the most important.

Bituminous rock is found over a wide area in the United States, the principal deposits being in the western half of Kentucky, in southern Oklahoma, in Uvalde County, Tex., and in the vicinity of Santa Cruz, Calif. Total sales of bituminous rock by producers in 1926 amounted to 672,750 short tons, valued at $3,598,230, or an average of $5.35 per ton. This amount represents an increase over 1925 of 23 per cent in volume and 7 per cent in total value but a 13 per cent drop in average value per ton at the mine. Kentucky was again the leading producing State, with sales of 320,430 tons, valued at $2,530,480, while Texas again ranked second, with sales of 289,980 tons, valued at $825,610. The value of the Kentucky product per ton at the mine was much higher than that of the bituminous rock produced in Texas, due to the greater distance to markets of the

Texas product, to the competition offered by the larger amount of petroleum asphalt produced in Texas, and possibly to superior qualities of the Kentucky product.

Bituminous rock is used chiefly in paving. For this purpose it must be crushed and brought to the proper consistency before application. There is no uniform rule regarding the bitumen content, the average being between 6 and 10 per cent. The greatest difficulty encountered in the preparation of bituminous rock for paving is obtaining uniformity. This is accomplished by several mixings. The ease of application of bituminous rock favors its use although this quality is nullified in the cold season when the material becomes too hard to apply.

NATURAL ASPHALTS

Natural asphalts include several natural hydrocarbons, more or less related, which have been found to be of commercial importance. They are as follows: (1) Gilsonite, (2) grahamite, (3) ozokerite, and (4) wurtzilite.

Gilsonite.—Gilsonite, or uintaite, is found in the United States only in a narrow belt along the Colorado–Utah border. It occurs in veins many of which are several feet wide and several miles long. In 1926 the entire output was from Utah; the sales by producers totaled 42,190 short tons, valued at $863,840, an increase of 7 per cent in quantity over 1925. Gilsonite is used chiefly in the manufacture of paints and varnishes, and also in the rubber trade, as it possesses the property of rendering rubber resistant to oxidation and changes in temperature.

Grahamite.—Grahamite has been found more widely distributed in the United States than most of the natural asphaltic hydrocarbons, notably in West Virginia and Oklahoma, as well as in Utah. It is used chiefly in the manufacture of roofing. No commercial production of grahamite has been reported since 1924.

Ozokerite.—Ozokerite, often called mineral wax, is found in the United States only in Utah, in Wasatch and Utah Counties. Probably the most famous deposit is that at Boryslaw in Galicia, which has supplied most of the ozokerite for the world trade. The competition of the Galician product and the general overproduction of wax at refineries have apparently been too severe for the domestic ozokerite mines; consequently there has been little development in recent years. In 1926 some production, which was stored for future delivery, was recorded near Soldier Summit, Utah. Imports in 1926 aggregated 8,287,397 pounds, valued at $479,957, an increase of 34 per cent in quantity over 1925. Ozokerite may be used either with little treatment as crude wax or by further refining as ceresine. It may also be used as a substitute for paraffin wax in making waxed paper, candles, and polishes. By reason of its high melting point, it has several special uses.

Wurtzilite.—Wurtzilite, often called elaterite, is found only in Uinta County, Utah, where it occurs in veins. Total sales of wurtzilite by producers in 1926 aggregated 240 short tons, valued at $22,890, or nearly $100 per ton, a decrease in quantity from 1925 but a considerable increase in value. Wurtzilite, after conversion to wurtzilite asphalt or "kapack," is used chiefly in the manufacture of resistant paints.

Native asphalt and related bitumens sold at mines in the United States, 1922–1926, by varieties and by States

[Value f. o. b. mine]

	1922		1923		1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Bituminous rock:										
Alabama			1,200	$4,200	8,498	$29,743	23,550	$77,080	22,000	$101,000
Texas	152,567	$558,274	151,356	555,533	220,598	779,696	204,530	692,730	289,980	825,610
California	97,924	907,664	2,945	11,780	3,731	14,688	2,680	16,100	3,330	19,310
Kentucky			184,300	1,468,396	274,743	2,386,557	286,850	2,493,360	320,430	2,530,480
Missouri					300	3,150				
Oklahoma	47,556	163,502	25,800	150,100	17,961	80,825	27,450	82,830	37,010	121,830
Total	298,047	1,629,440	365,601	2,190,009	525,831	3,294,059	545,060	3,362,100	672,750	3,598,230
Gilsonite: Utah	29,693	622,107	34,425	681,622	35,907	603,620	39,520	767,900	42,190	863,840
Grahamite:										
Oklahoma	41	533								
Utah					60	450				
Total	41	533			60	450				
Ozokerite: Utah			10	2,000	300	36,000				
Wurtzilite: Utah	11	1,100	200	12,000	269	24,210	270	18,400	240	22,890
Grand total	327,792	2,253,180	400,236	2,885,631	562,367	3,958,339	584,850	4,148,400	715,180	4,484,960
RÉSUMÉ BY STATES										
Alabama			1,200	4,200	8,498	29,743	23,550	77,080	22,000	101,000
Texas	152,567	558,274	151,356	555,533	220,598	779,696	204,530	692,730	289,980	825,610
California	97,924	907,664	2,945	11,780	3,731	14,088	2,680	16,100	3,330	19,310
Kentucky			184,300	1,468,396	274,743	2,386,557	286,850	2,493,360	320,430	2,530,480
Missouri					300	3,150				
Oklahoma	47,597	164,035	25,800	150,100	17,961	80,825	27,450	82,830	37,010	121,830
Utah	29,704	623,207	34,635	695,622	36,536	664,280	39,790	786,300	42,430	886,730
Grand total	327,792	2,253,180	400,236	2,885,631	562,367	3,958,339	584,850	4,148,400	715,180	4,484,960

MANUFACTURED OR PETROLEUM ASPHALT

Although all asphalt is now recognized as having been derived from petroleum, the refining of native asphalt was performed by natural agencies rather than by artificial means. Very little petroleum asphalt was produced prior to the twentieth century, as the asphaltic materials that were obtained as residuals by refining were inferior in quality. With the rise in production of petroleum of an asphaltic base in California during the early part of the twentieth century and the later discovery of the beneficial results obtained by the use of steam in refining, the petroleum asphalt industry was placed on a firm basis and grew rapidly. A further impetus was supplied when Mexican petroleum, which has a high asphalt content, was imported in quantity for the first time. On the whole, however, the growth of the petroleum asphalt industry was fairly steady, but, lacking the "human-interest" features of the natural deposits or pitch lakes, the industry did not receive the recognition justified by its size. Therefore, many are surprised that petroleum asphalt far outranks the other asphalts in importance. In 1926 total sales at refineries of petroleum asphalt, including road oil, amounted to 3,458,470 short tons, valued at $46,551,400, as compared with sales of native asphalts and related bitumens of 715,180 tons, valued at $4,484,960. Imports of the native asphalts (asphalt and bituminous rock) in 1926 aggregated 142,632 short tons; no petroleum asphalt was imported. This difference in foreign trade is nearly balanced by the excess of exports of the petroleum product. The asphalt manufactured at refineries in 1926 averaged nearly 5.8 barrels to the short ton, which factor, when applied to the total tonnage of sales, gives a total of about 20,000,000 barrels of asphalt. This amount is equivalent to 2.6 per cent of the total crude petroleum run to refinery stills in 1926.

In this report asphalt, or asphaltic materials, manufactured at refineries is divided into two classes—solid and semisolid products of less than 200 penetration and semisolid and liquid products of more than 200 penetration. In recent years the first class has considerably exceeded in importance the second class, most of which is known by the general term "flux." The year 1926 was no exception; total sales of the solid and semisolid products aggregated 2,402,180 short tons, valued at $33,700,150, as compared with 1,056,290 tons, including road oil, valued at $12,851,250, for the semisolid and liquid class.

Asphalt, both the solid and liquid varieties, is used chiefly in the paving and roofing industries, which together consumed 83 per cent of the total sales of petroleum asphalt excluding road oil in 1926.

PAVING

Asphalt is one of the important materials used in modern paving. Although it usually comprises less than 10 per cent of the total material used in road construction, because of its binding qualities it serves to form a compact, waterproof surface capable of withstanding the heaviest traffic. In road construction it is used as (1) cement, (2) filler, (3) carpet, and (4) dust preventive.

As a cement, asphalt is mixed hot with the surface material either before or after the latter is applied. The resulting material is much like "rock asphalt," which occurs naturally.

The utility of asphalt as a filler of joints has been recognized for a long time. Asphalt has been used in increasing quantities to fill the cracks that occur in concrete roads as well as a filler for paving stocks of all kinds.

Asphalt is often used as a protective layer or carpet on concrete or other types of roads. In this use its greatest competitor is its ancient rival, coal tars.

Perhaps the first use for asphaltic materials was as a dust preventive in the fruit-growing districts of California. This use spread rapidly, and, in 1926, 343,050 short tons, or nearly 100,000,000 gallons, of road oil was sold in the United States for this purpose. This was a small decrease from 1925, probably because some of the road oil had been sold as fuel oil, for which there was a relatively strong market in 1926.

The Bureau of Public Roads reports a total of 20,327 miles of State highways surfaced in 1926, of which 1,588 miles, or 8 per cent, was reported as surfaced with bituminous macadam by penetration or with sheet asphalt or bituminous concrete, in which both asphalts and tars were used as binders. The asphalt used in this way, however, represents only a fraction of the asphalt used in paving in 1926, as streets in cities and towns, the great users of surfacing materials, are not included in this survey.

ROOFING AND WATERPROOFING

In brief, the use of asphalt in roofing and waterproofing consists in saturating felts or burlaps or in applying a coating to them, or both. In 1926 this trade purchased a total of 1,123,030 short tons of asphalt, valued at $14,864,100, equivalent to 36 per cent of the total petroleum asphalt sales (excluding road oil) in 1926.

Asphalt and asphaltic material manufactured in the United States from petroleum and sold at refineries, 1925–26, by varieties

[Value f. o. b. refinery]

	From domestic petroleum		From foreign petroleum		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1925						
Solid and semisolid products of less than 200 penetration: [1]						
Asphalt—						
Paving	381,460	$5,055,830	944,790	$14,162,860	1,326,250	$19,218,690
Roofing and waterproofing	383,400	5,469,400	470,700	6,223,380	854,100	11,692,780
Mineral rubber	7,420	211,820	12,600	188,290	20,020	400,110
Other solid and semisolid products	62,550	685,870	87,310	1,307,410	149,860	1,993,280
	834,830	11,422,920	1,515,400	21,881,940	2,350,230	33,304,860
Semisolid and liquid products of more than 200 penetration: [1]						
Flux—						
Paving	27,740	313,980	59,200	781,100	86,940	1,095,080
Roofing and waterproofing						
Other	108,950	1,277,130	280,740	3,206,050	389,690	4,483,180
Other liquid products						
	136,690	1,591,110	339,940	3,987,150	476,630	5,578,260
Road oil	235,180	2,291,730	116,330	1,650,920	351,510	3,942,650
Grand total	1,206,700	15,305,760	1,971,670	27,520,010	[2] 3,178,370	42,825,770
1926						
Solid and semisolid products of less than 200 penetration: [1]						
Asphalt—						
Paving	471,000	6,026,920	868,320	12,928,530	1,339,320	18,955,450
Roofing and waterproofing	297,020	3,738,250	484,600	6,898,790	781,620	10,637,040
Mineral rubber	25,570	544,380	16,920	250,850	42,490	795,230
Other solid and semisolid products	101,720	1,263,100	137,030	2,049,330	238,750	3,312,430
	895,310	11,572,650	1,506,870	22,127,500	2,402,180	33,700,150
Semisolid and liquid products of more than 200 penetration: [1]						
Flux—						
Paving	14,340	175,460	112,470	1,422,950	126,810	1,598,410
Roofing and waterproofing	55,960	684,290	285,450	3,542,770	341,410	4,227,060
Other	1,930	34,450	168,410	1,983,840	170,340	2,018,290
Other liquid products	59,150	499,680	24,530	323,290	83,680	822,970
	131,380	1,393,880	590,860	7,272,850	722,240	8,666,730
Road oil	218,470	2,486,410	115,580	1,698,110	334,050	4,184,520
Grand total	1,245,160	15,452,940	2,213,310	31,098,460	[3] 3,458,470	46,551,400

[1] Definitions:

Paving asphalt.—Refined native asphalt and asphaltic cement, fluxed and unfluxed, produced for direct use in the construction of sheet asphalt, asphaltic concrete, asphalt macadam, and asphalt block pavements, and also for use as joint filler in brick, block, and monolithic pavements.

Roofing and waterproofing asphalt.—Asphalt and asphaltic cement used in saturating, coating, and cementing felt or other fabric and in the manufacture of asphalt shingles.

Mineral rubber.—Asphalt and asphaltic cement used by the rubber industry.

Other solid and semisolid products.—Asphalt and asphaltic cement used as dips and in the manufacture of insulating material, acid-resisting compounds, putty, mastic, and briquets and not included in the preceding definitions.

Flux.—Liquid asphaltic material used in softening native asphalt or solid petroleum asphalt for paving, roofing, waterproofing, and other purposes.

Other liquid products.—Petroleum asphalt used in the manufacture of saturant, paint, varnish, or other coating, exclusive of fuel oil, and not included in the preceding definitions.

Road oil.—Residual asphaltic oil used for surface treatment.

[2] The difference between this total and that reported under refinery statistics in the next table is due to differences in classification of liquid products; for example, road oil in the refinery statistics is classed as a miscellaneous product and not as asphalt.

REFINERY STATISTICS

The following data were obtained through a regular monthly canvass of refineries; the totals do not agree with the totals for asphalt produced from petroleum (p. 57) obtained by means of an annual canvass, primarily because of differences in classification.

Asphalt produced at refineries in the United States, 1925–26, in thousands of short tons

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1925													
East coast	50.2	42.0	69.5	101.1	135.7	121.5	117.7	124.8	126.3	138.0	110.5	59.8	1,197.1
Appalachian	.1		.1										.2
Indiana, Illinois, etc	19.3	17.1	17.9	16.7	17.6	17.2	15.7	15.4	15.1	15.0	14.9	14.4	196.3
Oklahoma, Kansas, etc					.3	.3				.1	.1		.8
Texas	26.7	20.3	23.9	29.4	33.3	42.0	36.8	38.9	33.0	30.1	27.0	24.6	366.0
Louisiana and Arkansas	25.4	17.8	23.5	25.5	37.1	35.2	38.3	44.6	41.2	45.9	36.2	25.2	395.9
Rocky Mountain	.9	1.1	1.4	1.2	4.5	4.8	6.0	3.2	3.8	3.1	1.9	1.5	33.4
California	39.4	20.8	38.1	35.1	36.2	44.9	58.6	59.3	45.2	52.2	27.8	30.1	487.7
	162.0	119.1	174.4	209.0	264.7	265.9	273.1	286.2	264.6	284.4	218.4	155.6	2,677.4
1926													
East coast	60.9	53.0	88.1	88.2	93.8	151.3	128.2	159.9	162.7	174.4	99.1	109.1	1,368.7
Appalachian													
Indiana, Illinois, etc	18.0	16.9	16.8	16.6	17.5	16.6	16.4	16.2	16.1	17.5	17.3	16.8	202.7
Oklahoma, Kansas, etc	.7	.7	.6	.7	.7	.7	.5	.4	.5	.5	.4	.4	6.8
Texas	16.1	21.2	24.2	14.3	27.0	23.8	26.7	23.4	26.5	17.1	23.9	17.2	261.4
Louisiana and Arkansas	27.1	30.9	35.4	34.5	55.1	59.2	59.8	56.0	54.6	59.1	32.7	35.0	539.4
Rocky Mountain	1.7	2.1	1.5	2.2	2.5	4.0	3.4	3.1	6.6	3.4	1.6	1.0	33.1
California	37.9	27.7	44.0	42.1	51.8	45.7	46.2	47.3	41.5	51.3	41.0	34.2	510.7
	162.4	152.5	210.6	198.6	248.4	301.3	281.2	306.3	308.5	323.3	216.0	213.7	2,922.8

Asphalt in stock at refineries in the United States at end of each month, 1925–26, in thousands of short tons

	January	February	March	April	May	June	July	August	September	October	November	December
1925												
East coast	60.3	58.9	62.3	66.2	80.5	71.1	86.7	83.0	74.4	84.1	83.5	78.1
Appalachian	.2	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Indiana, Illinois, etc.	6.5	7.9	11.3	10.9	11.5	11.3	11.5	10.1	9.3	8.3	10.6	13.8
Oklahoma, Kansas, etc.		.1	.1	.1	.2	.2	.7	.9	1.4	.9	.9	.9
Texas	16.2	12.4	14.7	12.2	11.6	12.4	13.8	11.3	11.7	9.8	9.0	8.6
Louisiana and Arkansas	14.3	17.7	19.1	18.9	17.3	17.7	15.2	13.9	15.4	15.8	22.0	24.5
Rocky Mountain	4.8	6.2	5.9	5.4	7.4	8.3	9.5	8.3	7.9	7.8	7.7	7.7
California	19.3	19.9	20.8	22.9	23.0	20.6	23.0	23.4	23.2	25.6	28.5	25.7
	121.6	123.2	134.3	136.7	151.6	141.7	160.5	151.0	143.4	152.4	162.3	159.4
1926												
East coast	81.2	85.2	103.9	143.1	124.6	97.8	78.6	93.7	84.4	79.0	60.6	77.5
Appalachian	.1	.1	.1				.1					
Indiana, Illinois, etc.	15.7	16.8	17.1	17.4	18.5	16.3	20.4	21.3	18.6	21.2	22.8	28.0
Oklahoma, Kansas, etc.	.8	.8	.8	.9	1.1	1.5	1.5	1.5	1.4	1.4	1.0	.9
Texas	10.8	12.5	7.6	8.4	9.0	9.3	7.4	6.8	10.0	7.0	7.4	8.3
Louisiana and Arkansas	27.4	29.2	29.4	28.9	29.9	28.3	30.1	33.3	29.7	28.9	25.7	27.3
Rocky Mountain	7.8	8.4	8.5	9.4	9.1	9.5	8.8	8.0	8.2	8.0	8.2	7.9
California	30.8	29.1	27.7	31.9	37.6	38.1	38.2	35.6	36.3	42.3	41.1	43.4
	174.6	182.1	195.1	240.0	229.8	200.8	185.1	200.2	188.6	187.8	166.8	193.3

The largest part of the petroleum asphalt produced in the United States is manufactured from foreign crude petroleum on the Atlantic and Gulf coasts. The bulk of the foreign crude petroleum consumed for this purpose is imported from Mexico, although asphalt is also being derived from Venezuelan crude in increasing quantities. The following table gives the quantities of foreign crude petroleum consumed at refineries on the East (Atlantic) coast and on the Texas and Louisiana Gulf coasts during the period 1925 to 1926:

Foreign crude petroleum run to stills at refineries in the United States, 1925–26, in thousands of barrels

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1925													
East coast	1,743	1,853	2,362	2,579	2,386	1,963	1,303	1,505	1,706	2,231	2,256	1,879	23,766
Texas Gulf coast	634	699	725	907	659	662	651	581	340	438	729	552	7,577
Louisiana Gulf coast	832	666	1,051	1,150	1,168	1,361	639	657	847	599	550	475	9,995
	3,209	3,218	4,138	4,636	4,213	3,986	2,593	2,743	2,893	3,268	3,535	2,906	41,338
1926													
East coast	1,948	1,860	2,664	2,287	2,386	2,113	2,249	2,663	2,896	2,656	2,572	3,002	29,296
Texas Gulf coast	441	459	513	460	219	266	305	248	217	171	238	147	3,684
Louisiana Gulf coast	311	904	933	1,041	1,159	1,235	1,216	1,247	1,123	859	967	988	11,983
	2,700	3,223	4,110	3,788	3,764	3,614	3,770	4,158	4,236	3,686	3,777	4,137	44,963

IMPORTS AND EXPORTS

Native asphalt and bituminous rock imported into the United States, 1923–1926, by countries

[General imports]

Country	1923		1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
North America:								
Bermuda					4	$428		
Canada	147	$3,358	1,275	$17,105	9	920	167	$2,211
Mexico	3	95			(1)	25	1,668	24,390
West Indies:								
British—								
Barbados	126	16,260	20	2,430	76	5,123	190	7,861
Jamaica					836	8,360		
Trinidad and Tobago	97,252	688,221	84,282	666,669	76,820	526,999	76,562	562,888
Other	560	14,850	134	600	58	1,336		
Cuba	282	7,933	346	9,203	2,323	60,535	11,886	94,087
Dominican Republic	15	2,545						
South America:								
Argentina	8	768			11	182	12	86
Colombia	18	468	55	627	22	1,473		
Ecuador							4,637	30,636
Venezuela	37,320	246,572	73,309	490,895	37,160	246,558	46,292	305,854
Europe:								
Belgium	3	124						
Denmark							49	800
France							3	78
Germany	1,393	18,009	902	12,123	1,465	19,817	1,126	15,167
Italy	2	1,010	11	1,322				
Netherlands			(1)	5	1	12	(1)	10
Spain	8	208						
Switzerland	(1)	95	1	233	3	185	2	483
United Kingdom	7,498	79,390	77	1,236	3,367	34,633	10	545
Yugoslavia and Albania							28	500
Asia:								
Palestine and Syria			7	711	7	838		
	144,635	1,079,906	160,419	1,203,159	122,162	907,424	142,632	1,045,596

[1] Figures for quantity not available.

Ozokerite and other mineral waxes imported for consumption in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	899,405	$90,510	1922	8,989,972	$371,161
1918	1,809,459	147,805	1923	4,856,357	213,407
1919	3,748,080	454,840	1924	3,113,819	207,833
1920	4,272,341	499,758	1925	6,175,184	361,767
1921	8,548,542	546,054	1926	8,287,397	479,957

Asphalt and related bitumens exported from the United States, 1917–1926

Year	Native asphalt				Petroleum asphalt		Total value
	Unmanufactured		Manufactures of	Total	Short tons	Value	
	Short tons	Value					
1917	30,107	$587,256	$585,472	$1,172,728			
1918	22,108	577,654	577,936	1,155,590			
1919	40,208	1,103,930	606,918	1,710,848			
1920	51,706	1,356,116	842,074	2,198,190	(1)	(1)	(1)
1921	45,367	1,178,038	621,224	1,799,262			
1922	57,362	1,344,440	[2] 1,261,125	2,605,565			
1923	72,628	1,500,869	[2] 2,075,628	3,576,497			
1924	52,568	1,245,670	[2] 2,212,260	3,457,930			
1925	32,835	825,654	[2] 2,525,618	3,351,272	89,014	$1,762,048	$5,113,320
1926	38,218	905,743	[2] 2,189,808	3,095,551	146,589	3,183,746	6,279,297

[1] Exports of petroleum asphalt not separately classified prior to 1925.

[2] Inclusive of value of squares (10 by 10 feet) of roofing asphalt as follows: 1922, 588,636 squares, $870,200; 1923, 783,028 squares, $1,124,491; 1924, 697,293 squares, $998,469; 1925, 661,662 squares, $919,977; 1926, 938,176 squares, $1,212,409. Corresponding exports not separately shown prior to 1922.

Asphalt exported from the United States in 1926, by countries

Country	Native asphalt and bitumen				Petroleum asphalt	
	Unmanufactured		Manufactures of, except roofing		Short tons	Value
	Short tons	Value	Short tons	Value		
North America:						
Canada	4,651	$105,947	3,715	$121,162	10,608	$193,584
Central America—						
British Honduras					3	72
Costa Rica	1	44	1	282		
Guatemala			3	90		
Honduras	6	157	120	5,085	12	251
Nicaragua					120	2,760
Panama	3	104	466	22,982	319	6,851
Salvador			16	2,667	2,066	37,862
Mexico	43	955	575	11,785	186	4,663
Newfoundland and Labrador	1	55	6	672	6	213
West Indies—						
British—						
Barbados			1	138		
Jamaica	53	1,859	367	15,702	63	1,133
Other	1	57	23	3,166	3	155
Cuba	1,452	15,819	980	29,826	156	3,976
Dominican Republic			4	722		
Dutch	1	34				
French			(1)	20		
Haitian Republic	125	2,645	1	151		
Virgin Islands of the United States			(1)	12		
South America:						
Argentina	721	14,480	1,165	49,908	1,807	42,525
Bolivia			1	60		
Brazil	132	3,114	977	36,101	205	5,898
Chile	36	1,344	219	8,661	197	5,205
Colombia	383	6,981	451	21,103	90	1,742
Ecuador	9	223	12	388	138	3,968
Guiana—						
British			(1)	93		
Dutch			1	30	1	30
Peru			47	3,607	833	14,401
Uruguay	75	2,584	525	25,885	214	5,834
Venezuela	13	472	35	3,654	19	577
Europe:						
Austria					55	1,159
Belgium	905	25,882	75	2,210	1,507	36,192
Denmark	3,976	83,362	69	4,614	280	7,089
Estonia	2	60				
Finland	34	943	50	1,887	49	1,418
France	2,327	60,300	777	25,048	3,770	88,211
Germany	2,984	92,431	1,264	32,841	21,020	531,610
Gibraltar			4	258		
Greece			10	205		
Irish Free State					78	1,500
Italy	1,920	40,833	301	11,662	3,019	49,329
Malta, Gozo, and Cyprus Islands			3	602		
Netherlands	311	12,808	177	7,478	7,383	176,514
Norway	184	3,862	233	6,194	48	1,052
Rumania			5	105		
Spain	139	3,274	461	19,805	1,213	27,029
Sweden	258	5,369	302	8,809	1,198	30,684
Switzerland			19	491		
Turkey in Europe			20	3,337		
United Kingdom	10,386	250,089	5,663	179,803	15,232	388,285
Asia:						
Arabia and Hejaz					281	8,062
Ceylon			179	6,232	1,795	49,739
China	174	4,582	718	21,147	8,321	142,202
East Indies—						
British—						
India	1,283	37,252	2,174	91,536	3,871	112,689
Malaya	103	4,396	85	4,087	1,840	36,522
Dutch			3	84	67	1,525
Indo-China (French)					2,013	35,667
Hong Kong	123	1,900			2,033	36,837
Japan, including Chosen	1,094	33,383	309	12,580	14,997	310,699
Java and Madura	1,949	36,400	103	19,589	6,312	107,454
Kwantung	90	1,820	57	1,384	414	9,051
Philippine Islands	562	10,440	9	1,331	2,045	34,868

[1] Less than 1 ton.

Asphalt exported from the United States in 1926, by countries—Continued

Country	Native asphalt and bitumen				Petroleum asphalt	
	Unmanufactured		Manufactures of, except roofing		Short tons	Value
	Short tons	Value	Short tons	Value		
Asia—Continued.						
Siam	11	$270			29	$755
Syria			1	$92		
Turkey in Asia			(1)	81		
Africa:						
British—						
East	1	18	348	16,048	94	2,738
South	169	6,091	1,415	58,223	2,064	68,223
West					433	14,705
Canary Islands			(1)	14		
Egypt			59	11,401		
French—Algeria and Tunisia			3	500		
Morocco					11	278
Portuguese East			28	695	289	8,727
Oceania:						
British—						
Australia	1,184	26,833	782	34,865	22,955	427,641
New Zealand	323	5,651	660	27,916	4,678	100,775
Other	20	620	11	241	149	2,817
French			(1)	52		
	38,218	905,743	26,088	977,399	146,589	3,183,746

[1] Less than 1 ton.

WORLD'S PRODUCTION [a]

Natural asphalt and related bitumens produced in the principal producing countries, 1922–1926, in metric tons [1]

Country [2]	1922	1923	1924	1925	1926
Barbados [3]	133	152	71	30	(4)
Canada (Alberta) [5]	(4)	(4)	482	1,041	479
Cuba [6]	109	2,098	3,643	1,572	(4)
France	48,477	40,292	51,491	52,446	52,900
Germany	54,619	46,244	57,359	64,115	(4)
Greece	410	1,300	(4)	(4)	(4)
Italy	68,647	151,908	187,244	273,668	298,200
Japan	280				(4)
Netherlands East Indies			650	670	(4)
Peru	8,829	(4)	2,708	1,043	(4)
Poland [7]	414	710	732	738	724
Rumania	13,016	21,967	19,731	15,709	(4)
Spain	5,933	3,936	5,476	5,580	(4)
Switzerland	22,045	[6] 19,904	[6] 33,150	[6] 35,848	(4)
Trinidad	185,587	224,900	227,460	204,335	(4)
United States	297,366	363,086	510,168	530,564	648,797
Venezuela	38,476	33,321	69,892	33,679	(4)
Yugoslavia			97	286	(4)

[1] Minerals included are native asphalt, asphalt rock, asphaltite, manjak, ozokerite, and bituminous rock used for other purposes than the extraction of oil. Oil shales, including ichthyolic shale, are not included.

[2] In addition to those listed, the following countries are reported to produce asphalt and related bitumens, but figures of output are not available: Albania, Iraq, Russia, and Syria.

[3] Exports of manjak.

[4] Data not available.

[5] Bituminous sands.

[6] Exports.

[7] Ozokerite.

[a] Compiled by L. M. Jones, of the Bureau of Mines.

PHYSICAL PROPERTIES AND CLASSIFICATION OF BITUMINOUS SUBSTANCES

The following tables were extracted from "Asphalts and Allied Substances," by Herbert Abraham, and show the principal characteristics and relationships of bituminous substances:

Classification of bituminous substances according to origin, physical properties, solubility, and chemical composition

Bituminous substances	Origin	Physical properties							Solubility		Composition
		Color in mass	Consistency	Luster	Feel	Odor	Volatility	Fusibility, nonmineral constituents	Nonmineral constituents in carbon disulphide	Sulphonation residue of 300 to 350° C. distillate	
Bitumen	Native	Variable (light to dark).	Variable (liquid to solid).				Variable	Harder varieties are fusible.	Largely soluble.	Considerable.	Hydrocarbons, substantially free from oxygenated bodies, sometimes associated with mineral matter.
Pyrobitumen	do	Dark	Comparatively hard.	Resinous to dull.	Nonadherent.		Nonvolatile.	Infusible	Relatively insoluble.		Hydrocarbons, which may or may not contain oxygenated bodies, sometimes associated with mineral matter.
Petroleum	do	Variable (light to dark).	Liquid		Oily	Characteristic ("oily").	Comparatively volatile.		Soluble	Considerable.	Hydrocarbons, substantially free from oxygenated bodies.
Mineral wax	Native or pyrogenous.	do	Viscous to solid.	Characteristic ("waxy").	Unctuous		Comparatively nonvolatile.	Fusible	do	do	Hydrocarbons, substantially free from oxygenated bodies, containing considerable crystallizable paraffins, sometimes associated with mineral matter.
Asphalt	do	Dark	Variable	Harder varieties resinous to dull.	Adherent to nonadherent.		do	do	Largely soluble.	do	Hydrocarbons, substantially free from oxygenated bodies, containing little to no crystallizable paraffins, sometimes associated with mineral matter.

Asphaltite	Native	do	Comparatively hard.	Resinous	Nonadherent.		Nonvolatile.	Difficultly fusible.	do	do	Hydrocarbons, substantially free from oxygenated bodies and crystallizable paraffins, sometimes associated with mineral matter.
Asphaltic pyrobitumen.	do	do	do	Resinous to dull.	do		do	Infusible	Largely insoluble.		Hydrocarbons, substantially free from oxygenated bodies, sometimes associated with mineral matter.
Nonasphaltic pyrobitumen.	do	do	do	do	do		do	do	do		Hydrocarbons, containing oxygenated bodies, sometimes associated with mineral matter.
Tar	Pyrogenous	do	Liquid		Oily	Characteristic ("tarry").	Comparatively volatile.		Largely soluble.	Comparatively little.	Variable.
Pitch	do	do	Viscous to solid.	Resinous to dull.	Adherent to nonadherent.		Comparatively nonvolatile.	Fusible	do	do	Do.

Classification of bituminous substances according to genus, species, and member

Genus	Species	Member	Remarks
Bitumens	Petroleums	Nonasphaltic petroleum	Contains an appreciable quantity of crystallizable paraffin and no asphalt.
		Mixed-base petroleum	Contains crystallizable paraffin, also asphalt.
		Asphaltic petroleum	Contains an appreciable quantity of asphalt and no crystallizable paraffin.
	Native mineral waxes.	Ozokerite	A paraffinaceous mineral, called ceresine when refined.
		Montan wax	The wax extracted from lignite or pyropissite by means of solvents.
	Native asphalts	Pure or fairly pure	Comparatively free from associated mineral matter (less than 10 per cent on the dry weight).
		Associated with mineral matter ("rock asphalt").	Containing a substantial proportion of sand, sandstone, limestone, clay, or shale.
	Asphaltites	Gilsonite	Extremely pure. Have a higher fusing point than asphalts—derived from petroleum.
		Glance pitch	Pure to moderately pure. Have a higher fusing point than asphalts—derived from petroleum.
		Grahamite	Pure to quite impure. Have a higher fusing point than asphalts—derived from petroleum.
Pyrobitumens	Asphaltic pyrobitumens.	Elaterite	Rubbery—partly saponifiable. Generally pure. Infusible and insoluble. Derived from petroleum.
		Wurtzilite	Depolymerizes on heating, becoming fusible and soluble. Generally pure. Infusible and insoluble. Derived from petroleum.
		Albertite	Depolymerizes partially on heating. Generally pure. Infusible and insoluble. Derived from petroleum.
		Impsonite	Does not depolymerize on heating. Generally pure. Infusible and insoluble. Derived from petroleum.
		Asphaltic pyrobituminous shales.	Mineral matters predominate. Infusible and insoluble.
	Nonasphaltic pyrobitumens.	Peat	Pure or fairly pure. Infusible and insoluble. Contain more or less oxygenated bodies. Derived from vegetable growths. Gradual transition from peat to lignite to coal.
		Lignite	Pure or fairly pure. Infusible and insoluble. Contain more or less oxygenated bodies. Derived from vegetable growths. Gradual transition from peat to lignite to coal.
		Bituminous coal	Pure or fairly pure. Infusible and insoluble. Contain more or less oxygenated bodies. Derived from vegetable growths. Gradual transition from peat to lignite to coal.
		Anthracite	Pure or fairly pure. Infusible and insoluble. Contain more or less oxygenated bodies. Derived from vegetable growths. Gradual transition from peat to lignite to coal.
		Lignitic and coal shales	Mineral matters predominate; otherwise the same as the foregoing.
Pyrogenous distillates.	Pyrogenous waxes.	Wax tailings	Distillate from petroleum obtained immediately prior to coking.
		Petroleum paraffin	Solid paraffin obtained from nonasphaltic petroleum.
		Peat paraffin	Solid paraffin obtained from peat tar.
		Lignite paraffin	Solid paraffin obtained from lignite tar.
		Shale paraffin	Solid paraffin obtained from shale tar.
	Tars	Oil-gas tar	Produced by cracking petroleum vapors in manufacturing oil gas.
		Water-gas tar	Produced by cracking petroleum vapors in manufacturing carburetted water gas.
		Pine tar	Produced by the destructive distillation of the wood and roots of coniferæ.
		Hardwood tar	Produced by the destructive distillation of hardwoods.
		Peat tar	Produced by the destructive distillation of peat.
		Lignite (brown coal) tar	Produced by the destructive distillation of lignite (brown coal).
		Shale tar	Produced by the destructive distillation of pyrobituminous shales.
		Gas-works coal tar	Produced from gas-house retorts in manufacturing gas from bituminous coal.
		Coke-oven coal tar	Produced from by-product coke ovens in manufacturing coke from bituminous coal.
		Blast-furnace coal tar	Produced from blast furnaces upon smelting metals with bituminous coal.
		Producer-gas coal tar	Produced from gas producers in manufacturing producer gas from coal.
		Bone tar	Produced by the destructive distillation of bones.

Pyrogenous residues.	Pyrogenous asphalts.	Residual oils	Produced by the dry distillation of nonasphaltic petroleum, the dry or steam distillation of mixed-base petroleum, or the steam distillation of asphaltic petroleum.
		Blown petroleum asphalts	Produced by blowing air through heated residual oils.
		Residual asphalts	Produced by the steam distillation of mixed-base and asphaltic petroleums.
		Sludge asphalts	Produced from the acid sludge obtained in the purification of petroleum distillates with sulphuric acid.
		Wurtzilite asphalt	Produced by depolymerizing wurtzilite in closed retorts.
	Pitches	Oil-gas-tar pitch	Residues obtained by the partial evaporation or distillation of the corresponding tars.
		Water-gas-tar pitch	
		Wood-tar pitch	
		Peat-tar pitch	
		Lignite-tar pitch	
		Shale-tar pitch	
		Gas-works coal-tar pitch	
		Coke-oven coal-tar pitch	
		Blast-furnace coal-tar pitch	
		Producer-gas coal-tar pitch	
		Bone-tar pitch	
		Rosin pitch	Residue obtained by the partial distillation of the resinous sap of coniferæ.
		Fatty-acid pitch	Residue obtained by the steam distillation of fatty acids.

PRODUCERS

NATIVE ASPHALT AND RELATED BITUMENS

Production of native asphalt and related bitumens was reported in this country in 1926 by the following operators:

Absopure Gilsonite Co., 615 Cooper Building, Denver, Colo.
Alabama Rock Asphalt (Inc.), Margerum, Ala.
American Asphalt Association, 919 Wainwright Building, St. Louis, Mo.
Bitumen Mines Operation, 701 Post Street, San Francisco, Calif.
Colbert Limerock Asphalt Co., Cherokee, Ala.
Crown Rock Asphalt Co., 911 Neave Building, Cincinnati, Ohio.
Diamond Gilsonite Co., 587 Court Street, Brooklyn, N. Y.
Garfield Rock Asphalt Co., 340 Starks Building, Louisville, Ky.
Gilson Asphaltum Co., 1600 Arch Street, Philadelphia, Pa.
Kentucky Rock Asphalt Co., Marion E. Taylor Building, Louisville, Ky.
Natural Rock Asphalt Corporation, Owensboro, Ky.
Ohio Valley Rock Asphalt Co., Louisville, Ky.
Ozokerite Mining Co., Soldier Summit, Utah.
Raven Mining Co. of Utah, 140 South Dearborn Street, Chicago, Ill.
Rock Asphalt Co. of America, Louisville, Ky.
Rock Asphalt Corporation, Cherokee, Ala.
Texas Rock Asphalt Co., San Antonio, Tex.
Utah Gilsonite Co., Wainwright Building, St. Louis, Mo.
Uvalde Rock Asphalt Co., San Antonio, Tex.
Western Paving Co., Tradesman's Building, Oklahoma City, Okla.
White's Uvalde Mines, P. O. Box 902, San Antonio, Tex.

MANUFACTURED ASPHALT

The following operators reported the production of asphaltic material from crude petroleum in the United States in 1926:

Atlantic Refining Co., 260 South Broad Street, Philadelphia, Pa.
Barber Asphalt Co., 1600 Arch Street, Philadelphia, Pa.
Beacon Oil Co., 111 Devonshire Street, Boston, Mass.
Freeport Asphalt Co., Freeport, Tex.
Gulf Refining Co., Frick Building Annex, Pittsburgh, Pa.
Indian Refining Co., Lawrenceville, Ill.
Louisiana Oil & Refining Corporation, Shreveport, La.
Magnolia Petroleum Co., Box 1667, Dallas, Tex.
Mexican Petroleum Corporation, 120 Broadway, New York, N. Y.
Mexican Petroleum Corporation of Louisiana (Inc.), 120 Broadway, New York, N. Y.
Midwest Refining Co., Denver, Colo.
New England Oil Refining Co., Fall River, Mass.
New Orleans Refining Co., United Fruit Building, New Orleans, La.
Pan American Petroleum Co., 1034 Petroleum Securities Building, Los Angeles, Calif.
Paraffine Companies (Inc.), 475 Brannan Street, San Francisco, Calif.
Pioneer Asphalt Co., Lawrenceville, Ill.
Seaside Oil Co., Summerland, Calif.
Sinclair Refining Co. of Louisiana (Inc.), 45 Nassau Street, New York, N. Y.
Standard Oil Co. of California, 225 Bush Street, San Francisco, Calif.
Standard Oil Co. (Indiana), 910 South Michigan Avenue, Chicago, Ill.
Standard Oil Co. of Louisiana, Baton Rouge, La.
Standard Oil Co. (New Jersey), 26 Broadway, New York, N. Y.
Standard Oil Co. of New York, 26 Broadway, New York, N. Y.
Standard Oil Co. of Ohio, East Ohio Gas Building, Cleveland, Ohio.
Sun Oil Co., 1428 South Penn Square, Philadelphia, Pa.
The Texas Co., Houston, Tex.
Tidewater Oil Co., 11 Broadway, New York, N. Y.
Union Oil Co. of California, Union Oil Building, Los Angeles, Calif.
Warner Quinlan Co., 26 Beaver Street, New York, N. Y.

ASPHALT ASSOCIATIONS

The members of the asphalt industry established in 1919 the Asphalt Association, which, in addition to other activities, is engaged in collecting and disseminating information useful to both producers and users of asphalt. The address of the association is 441 Lexington Avenue, New York, N. Y. Branch offices are at the following addresses:

1319 F Street NW., Washington, D. C.
729 Hearst Building, Hearst Square, Chicago, Ill.
Whitney Central Building, New Orleans, La.
25 North Pearl Street, Albany, N. Y.
501 Wilder Building, Charlotte, N. C.
Excelsior Life Insurance Building, Toronto, Ontario, Canada.

The officers are: President, J. S. Helm, of the Standard Oil Co. of New Jersey; vice president, L. M. Law, of the New Orleans Refining Co.; treasurer, Herbert Spencer, of the Standard Oil Co. of New Jersey; secretary and general manager, J. E. Pennybacker.

The Western Asphalt Association, patterned after the association noted above and composed of the leading producers of asphalt on the Pacific coast and the large contractors who build asphalt roads, was formed during the latter part of 1926. Its purpose is to educate the public as to the merits of asphaltic-type roads and to carry on research work. The headquarters of this association are at 805 Quinby Building, Los Angeles, Calif.

SALT, BROMINE, AND CALCIUM CHLORIDE

By A. T. Coons [1]

SALT

PRODUCTION

The quantity of salt produced for sale or use by operators of salt mines, wells, and ponds in the United States in 1926 was slightly less than in 1925. The value decreased about 4 per cent as compared with 1925. Sales of rock salt, including pressed blocks from rock salt, were 9 per cent less in 1926 than in 1925, and sales of evaporated salt, including pressed blocks from evaporated salt, declined 2 per cent. The salt content of brine produced and used by producers for the manufacture of chemicals was 8 per cent more than for 1925. In 1926, as in 1925, the salt industry was characterized by keen competition, a tendency to overproduction, and a lowering of prices that resulted in the closing down of small plants or their absorption by larger operators. Several of the larger manufacturers have plants in more than one district and can supply their markets from the nearest plant, thereby reducing freight costs.

The average value of all salt sold in 1926 was $3.40 a short ton—14 cents less than in 1925. The average value of evaporated salt, including pressed blocks from evaporated salt, was $7.31, or 32 cents less than in 1925. The average value of rock salt sold, including pressed blocks from rock salt, was $3.39—21 cents more than in 1925. There were 92 plants reporting operations in 1926 as compared with 97 in 1925.

Salt sold or used by producers in the United States, 1917–1926

Year	Short tons				Value [a]	
	Manufactured (evaporated)	In brine	Rock salt	Total	Total	Average
1917	2,482,564	2,890,588	1,605,025	6,978,177	$19,940,442	$2.86
1918	2,724,203	2,830,600	1,683,941	7,238,744	26,940,361	3.72
1919	2,392,290	2,850,639	1,639,973	6,882,902	27,074,694	3.93
1920	2,409,924	2,819,916	1,610,189	6,840,029	29,894,075	4.37
1921	1,931,243	1,577,335	1,472,576	4,981,154	24,557,966	4.93
1922	2,276,683	2,569,042	1,947,124	6,792,849	27,464,838	4.04
1923	2,239,872	2,787,239	2,103,602	7,130,713	27,795,941	3.90
1924	2,224,555	2,513,853	2,064,707	6,803,115	25,747,048	3.78
1925	2,235,170	2,819,690	2,342,640	7,397,500	26,162,361	3.54
1926	2,198,060	3,037,820	2,135,720	7,371,600	25,055,012	3.40

[a] The values are f. o. b. mine or refinery, and do not include cost of cooperage or containers.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Salt sold or used by producers in the United States, 1923–1926, by States

State	1923		1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
California	252,465	$1,327,917	268,112	$1,361,166	292,480	$1,420,924	288,440	$1,397,587
Idaho	31	310	33	350	(1)	(1)	(1)	(1)
Kansas	845,163	3,570,135	794,303	2,781,217	812,540	2,494,423	729,880	2,741,534
Louisiana	359,161	1,808,762	383,104	2,182,797	500,350	2,218,265	520,400	2,457,875
Michigan	2,127,412	8,684,148	1,918,463	7,864,838	2,172,600	7,710,331	2,260,320	7,594,418
New Mexico	525	5,250	1,700	17,000	(1)	(1)	(1)	(1)
New York	2,065,842	7,431,155	1,972,808	6,739,597	2,053,970	7,133,244	2,001,580	6,564,829
Ohio	1,102,387	3,695,248	1,102,214	3,641,585	1,173,590	4,116,625	1,164,400	3,209,473
Porto Rico	5,875	8,225	14,466	29,932	12,060	28,751	10,480	19,182
Utah	81,449	468,765	78,577	463,143	88,150	432,846	77,350	422,317
West Virginia	31,589	284,196	37,561	258,089	25,870	180,053	23,180	170,953
Undistributed [2]	258,814	511,830	231,774	407,334	265,890	426,899	295,570	476,844
	7,130,713	27,795,941	6,803,115	25,747,048	7,397,500	26,162,361	7,371,600	25,055,012

[1] Included under "Undistributed."
[2] 1923, Nevada, Texas, and Virginia; 1924, Texas and Virginia; 1925, Idaho, Nevada, New Mexico, Texas, and Virginia; 1926, Idaho, Nevada, New Mexico, Oklahoma, Texas, and Virginia.

Louisiana and Michigan were the only important producing States that showed a larger output in 1926. The increase in Louisiana was in rock salt and in Michigan in the salt content of brine used for manufacture of chemicals.

Production of salt was reported from Oklahoma for the first time since 1918.

Salt sold or used by producers in the United States, 1925–26, by methods of manufacture

Method of manufacture	1925		1926	
	Short tons	Value	Short tons	Value
Evaporated in open pans or grainers	734,990	$6,690,218	693,140	$6,166,677
Evaporated in vacuum pans	1,043,230	8,038,228	[1] 1,055,310	[1] 7,557,418
Solar evaporated	321,470	1,252,610	323,940	1,301,942
Pressed blocks from evaporated salt	135,480	1,069,685	125,670	1,038,292
Rock	2,306,910	7,237,981	2,106,850	7,038,343
Pressed blocks from rock salt	35,730	206,818	28,870	196,414
Salt in brine (sold or used as such)	2,819,690	1,666,821	3,037,820	1,755,926
	7,397,500	26,162,361	7,371,600	25,055,012

[1] Includes a quantity of salt manufactured by the spray system of cooling.

New York, Louisiana, Kansas, and Michigan produced more than 99 per cent of the rock salt reported in 1926.

Rock salt sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	1,605,025	$3,897,595	1922	[1] 1,947,124	[1] $7,489,644
1918	1,683,941	5,684,661	1923	[1] 2,103,602	[1] 7,843,419
1919	1,639,973	6,224,920	1924	[1] 2,064,707	[1] 7,501,419
1920	[1] 1,610,189	[1] 7,048,315	1925	[1] 2,342,640	[1] 7,444,799
1921	[1] 1,472,576	[1] 6,693,923	1926	[1] 2,135,720	[1] 7,234,757

[1] Includes pressed blocks made of rock salt, as follows: 1920, 15,182 tons, valued at $172,211; 1921, 20,148 tons, valued at $169,244; 1922, 38,593 tons, valued at $245,174; 1923, 38,043 tons, valued at $281,302; 1924, 36,624 tons, valued at $263,260; 1925, 35,730 tons, valued at $206,818; 1926, 28,870 tons, valued at $196,414.

Evaporated salt sold or used by producers in the United States, 1925–26, by States

State	1925		1926	
	Short tons	Value	Short tons	Value
California	277,010	$1,351,327	272,440	$1,333,587
Kansas	244,310	1,719,347	236,710	1,887,679
Michigan	841,970	6,512,752	828,000	6,287,339
New York	384,190	3,121,631	385,810	3,127,155
Ohio	287,020	3,220,936	287,400	2,332,473
Porto Rico	12,060	28,751	10,480	19,182
Utah	86,100	424,035	74,540	410,962
West Virginia	25,870	180,053	23,180	170,953
Undistributed [1]	76,640	491,909	79,500	494,999
	2,235,170	17,050,741	2,198,060	16,064,329

[1] 1925, Louisiana, Nevada, New Mexico, and Texas; 1926, Idaho, Louisiana, Nevada, New Mexico, Oklahoma, and Texas.

Total sales of pressed blocks reported by the salt producers decreased 10 per cent. Blocks made from evaporated salt decreased 7 per cent and those from rock salt 19 per cent. The production of these blocks from both evaporated salt and rock salt, as reported by the original producers of the salt and shown in the following table, does not represent the entire pressed-block industry because some firms that do not produce salt are making pressed blocks from salt bought in the open market. Pressed blocks from evaporated salt are made chiefly by salt producers in Kansas and Michigan, but are produced also in Texas, Utah, Ohio, and California. Pressed blocks from rock salt are made by salt producers in Michigan, Louisiana, and New York.

In 1926 the average value of pressed blocks from evaporated salt was $8.26 a ton; the average value of the blocks made from rock salt was $6.80.

Pressed salt blocks sold by original producers of the salt in the United States, 1918–1926

Year	Short tons	Value	Year	Short tons	Value
1918	94,150	$939,900	1923	166,116	$1,544,548
1919	119,510	1,358,757	1924	172,344	1,322,744
1920	129,224	1,515,041	1925	171,210	1,276,503
1921	117,739	1,275,483	1926	154,540	1,234,706
1922	172,682	1,554,429			

IMPORTS AND EXPORTS

According to figures obtained from the Bureau of Foreign and Domestic Commerce, the salt imported into and exported from the United States in the last 10 years has been as follows:

Salt imported for consumption in the United States, 1917–1926

Year	In bags, barrels, and other packages		In bulk		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	13,472	$139,339	51,450	$140,796	64,922	$280,135
1918	10,259	148,128	30,031	133,340	40,290	281,468
1919	9,676	137,627	49,838	105,077	59,514	242,704
1920	29,567	240,923	108,087	435,576	137,654	676,499
1921	38,374	333,282	54,721	197,749	93,095	531,031
1922	[1] 24,392	[1] 216,718	89,530	305,620	113,922	522,338
1923	[1] 36,185	[1] 240,970	52,565	142,288	88,750	383,258
1924	[1] 40,426	[1] 209,641	48,512	114,451	88,938	324,092
1925	[1] 26,973	[1] 188,912	58,815	127,915	85,788	316,827
1926	[1] 29,008	[1] 138,356	26,956	63,887	55,964	202,243

[1] Includes salt imported for curing fish, as follows: 1922, 2,252 short tons, valued at $5,549; 1923, 16,472 tons, $46,260; 1924, 27,096 tons, $61,581; 1925, 17,976 tons, $51,332; 1926, 24,310 tons, $50,915.

Salt imported into the United States, 1923–1926, by countries

[General imports]

Country	1923		1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
North America:								
Canada	3,064,500	$17,736	3,476,843	$20,554	3,744,003	$20,680	2,931,833	$4,884
Guatemala	500	26						
Mexico					3,875	31	1,486,152	2,637
West Indies—								
British—								
Barbados	1,012,600	1,153						
Jamaica	3,575,700	4,169	15,422,360	16,548	12,604,350	19,080	10,997,900	16,403
Other British	70,100,600	79,781	50,040,105	57,446	43,797,963	47,363	30,946,870	37,145
Dominican Republic					209,437	380		
Dutch	3,050,600	4,431	4,094,929	5,181	10,546,196	11,911	5,040,610	6,085
French	2,390,000	2,785	180,000	270	198,414	360	112,240	173
Virgin Islands of the United States					4,000	18		
Europe:								
Belgium	440,000	2,070			17	2		
France					232,960	2,633	2,505	32
Germany	57,453,100	135,959	40,951,106	72,226	25,013,932	44,167	7,031,969	12,697
Italy	10,304,000	10,350						
Malta, Gozo, and Cyprus Islands			22,400	86				
Netherlands	561,100	2,503	896,000	1,200				
Spain	17,277,600	16,396	35,996,400	29,947	30,128,000	31,066	44,127,543	39,501
Turkey in Europe							56,000	484
United Kingdom	16,448,500	121,253	15,764,896	121,173	15,434,656	123,994	9,379,063	87,210
Asia:								
Hong Kong	200	57	280	24				
Japan	100	3					1,120	24
Africa:								
Algeria and Tunisia	11,200,000	5,646	31,997,564	18,626	15,423,275	10,459	9,240,320	7,644
Portuguese			380,800	110			100,800	90
Oceania:								
Australia					2,240	63		
French					2,678,089	7,576		
	196,879,100	404,318	199,223,683	343,391	160,021,407	319,783	121,454,925	215,009

Salt exported from the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	113,993	$1,000,773	1922	134,989	$1,429,172
1918	136,783	1,677,577	1923	125,529	1,211,226
1919	119,416	1,396,625	1924	144,945	1,288,376
1920	139,272	1,901,593	1925	155,079	1,219,935
1921	109,563	1,415,471	1926	158,908	1,277,790

Salt exported from the United States, 1923–1926, by countries

Country	1923		1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
North America:								
Bermuda	186,530	$2,350	223,036	$2,905	237,183	$3,034	148,867	$2,174
British Honduras	344,563	3,028	330,945	2,843	280,815	2,317	416,170	3,332
Canada	188,954,715	696,709	217,560,848	754,836	231,093,426	672,285	225,134,503	697,230
Central American States—								
Costa Rica	185,474	2,000	187,533	2,378	92,310	1,124	134,500	1,585
Guatemala	901,808	5,394	189,319	3,082	230,384	2,779	292,907	4,139
Honduras	2,938,624	27,093	2,122,121	20,318	2,520,355	22,929	2,231,638	20,412
Nicaragua	633,060	8,482	762,409	8,856	678,543	9,185	688,778	8,284
Panama	1,802,170	16,676	1,730,796	15,499	1,686,112	15,569	1,903,410	17,188
Salvador	40,096	274	948	22	102,846	705	376	19
Mexico	7,375,088	88,071	10,292,980	97,881	11,480,952	111,072	16,043,576	126,619
Miquelon, Langley, etc	2,564	78	1,080	34	5,340	140	3,080	93
Newfoundland and Labrador	678,640	1,135	91,635	1,107	171,854	1,885	128,800	575
West Indies—								
British—								
Barbados	100	4			680	11		
Jamaica	4,496	107	272,136	1,631	268,808	1,215	47,462	315
Trinidad and Tobago			350	10				
Other British	15,415	297	15,472	297	4,716	141	24,639	486
Cuba	38,895,196	267,960	51,662,620	292,033	56,794,230	287,722	64,815,515	315,423
Dominican Republic	199,527	5,423	202,357	4,601	167,505	4,793	34,756	1,075
Dutch	440	23	620	35	7,029	89	201	5
French	934	27			300	10		
Haiti	4,428	155	7,749	294	18,358	537	10,816	419
Virgin Islands of the United States	34,634	159	2,852	86	2,895	90	4,444	136
South America:								
Argentina	383,216	2,939	12,500	163	47,350	1,224	87,534	1,537
Bolivia			1,000	165				
Chile	705	24	1,030	37	1,780	66	3,360	129
Colombia	100,380	1,541	103,332	2,037	68,737	1,002	55,307	1,222
Ecuador			450	45	1,544	130	25,896	442
Guiana—								
British			96	2				
Dutch	14,255	232						
Paraguay	1,701	74	1,200	44			2,425	90
Peru			60	6	500	14		
Uruguay	22,000	118			500	47		
Venezuela	16,102	307			170	26	145	11
Europe:								
Denmark	4,800	165						
France	24,000	210	8,018	71	23,287	183	27,000	245
Germany			8,625	73	18,818	145		
Iceland and Faroe Islands			1,000	36	1,300	45		
Netherlands			1,526	19				
Poland and Danzig	880	50						
Russia	764	28					[1] 432	[1] 12
Sweden					11,000	120		
United Kingdom			142,274	755	158,080	887	82,512	793
Yugoslavia and Albania			1,400	50				

[1] Recorded as Soviet Russia in Europe.

Salt exported from the United States, 1923–1926, by countries—Continued

Country	1923		1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Asia:								
Ceylon	1,503	$155	2,750	$273	3,086	$292	2,940	$272
China	31,522	2,239	54,115	3,314	56,124	4,680	56,178	3,774
Chosen	6,520	188	1,398	33	3,882	89	(2)	(2)
East Indies—								
British—								
India	5,404	535	4,522	412	7,542	736	7,594	687
Straits Settlements	168	18	696	70	600	57	[3] 2,158	[3] 159
Dutch	384	44					100	10
Far Eastern Republic	20,180	168						
Hong Kong	30,687	2,205	42,700	2,652	52,537	2,429	40,041	2,269
Indo-China, French	1,417	87						
Japan	2,167,294	10,762	159,740	1,013	162,966	735	[2] 76,555	[2] 467
Java and Madura	3,726	380	2,220	183	1,362	118	3,278	262
Kwantung	1,530	88	3,000	260	2,940	259	3,520	234
Philippine Islands	2,718,770	17,955	403,938	11,105	462,587	9,931	338,026	10,125
Russia					206,092	1,059	[4] 110,390	[4] 632
Siam	3,492	376	1,550	155	5,040	500	5,190	461
Other							624	30
Africa:								
British South Africa	2,880	124						
Canary Islands			4,000	120				
Egypt	375	14						
Liberia					978	20		
Portuguese Africa—								
East	4,560	50						
Other	399	18	274	8	115	7	240	25
Oceania:								
British—								
Australia	1,647,691	31,862	2,812,921	49,063	2,422,637	46,749	4,365,861	47,479
New Zealand	364,180	9,153	98,300	2,815	302,793	7,429	192,030	3,621
Other British	11,500	187	14,750	298	14,900	330	56,850	1,123
French	261,357	3,412	296,762	3,887	252,935	2,429	205,502	2,170
Other	4,326	73	45,150	464	21,936	565		
	251,057,170	1,211,226	289,889,103	1,288,376	310,158,759	1,219,935	317,816,126	1,277,790

[3] Chosen included with Japan.
[3] Recorded as British Malaya (Straits Settlements).
[4] Recorded as Soviet Russia in Asia.

WORLD'S PRODUCTION

The quantities of salt produced in the chief countries of the world during the five years 1921–1925 are shown in the following table:

Salt produced in the chief countries of the world, 1921–1925, in metric tons [1]

Country	1921	1922	1923	1924	1925
North America:					
Canada	[2] 149,374	[2] 164,920	187,773	191,176	216,729
Mexico [3]	67,000	67,000	67,000	67,000	67,000
Panama [4]	677	826	(5)	(5)	(5)
United States—					
Rock salt	1,335,891	1,766,392	1,908,346	1,873,061	2,125,196
Other salt	3,182,912	4,395,945	4,560,494	4,298,589	4,585,668
West Indies—					
British—					
Bahamas [4]	3,201	3,079	2,723	1,595	1,312
Grenada (Windward Islands) [4]	42	20	67	54	71
Leeward Islands [4]	(5)	(5)	(5)	1,207	(5)
Turks and Caicos Islands [4]	(5)	66,704	58,992	53,167	63,434
Netherlands [4]	17,810	18,459	11,795	8,894	18,377
South America:					
Argentina [6]	75,968	93,698	110,701	122,432	75,351
Chile	39,466	33,743	38,242	36,093	29,334
Colombia [3]	29,000	29,000	29,000	29,000	29,000
Peru	26,350	26,126	26,522	28,974	28,192
Venezuela [3]	30,000	30,000	30,000	30,000	30,000

[1] Compiled by L. M. Jones, of the Bureau of Mines.
[2] Sales and shipments.
[3] Estimated annual production.
[4] Exports.
[5] Data not available.
[6] Railway shipments.

Salt produced in the chief countries of the world, 1921–1925, in metric tons—Continued

Country	1921	1922	1923	1924	1925
Europe:					
Austria—					
Rock salt	1,815	2,328	1,520	2,744	2,087
Other salt	126,754	142,072	81,771	108,425	128,720
Czechoslovakia	91,199	128,179	134,080	124,773	126,000
France—					
Rock salt and salt from springs	793,151	1,083,197	1,188,586	1,317,908	1,462,420
Other salt	212,251	306,531	337,703	256,943	262,008
Germany—					
Rock salt	1,655,753	2,684,318	1,583,978	1,596,416	1,766,788
Other salt	304,466	391,178	291,518	377,277	456,682
Greece	65,000	67,500	59,908	68,542	79,680
Italy—					
Rock salt	45,440	49,802	52,754	56,896	63,984
Other salt	468,151	740,507	711,892	750,424	851,653
Netherlands—Rock salt	25,465	28,334	26,813	32,054	34,053
Poland	301,612	295,403	363,307	[7] 275,266	330,030
Portugal [4]	77,063	[5]	106,280	90,804	[5]
Rumania	232,818	285,212	306,612	302,761	330,356
Russia [8]	983,676	789,516	966,456	[9] 1,192,809	[9] 1,326,939
Spain—					
Rock salt	37,996	114,400	98,619	105,450	106,627
Other salt	475,143	566,480	617,207	862,856	763,514
Switzerland	339,000	64,268	68,026	[5]	[5]
United Kingdom—					
Great Britain and Isle of Man—					
Rock salt	24,525	26,998	38,494	43,076	35,281
Other salt	[10] 1,302,609	1,756,017	1,860,170	2,016,914	1,912,061
Ireland—					
Rock salt	11,760	[5]	[5]	[5]	[5]
Other salt	[10]				
Yugoslavia	34,922	43,872	[3] 46,000	48,864	48,499
Asia:					
Ceylon	13,952	39,623	28,834	9,412	20,588
China (including Kwantung)	[11] 2,075,000	[3] 2,000,000	[3] 2,000,000	[3] 2,000,000	[3] 2,000,000
Chosen	56,000	45,000	40,200	[5]	[5]
Cyprus [4]	899	3,022	778	813	1
India—					
British (including Aden)—					
Rock salt	150,414	216,639	121,594	192,274	152,794
Other salt	1,407,881	1,469,804	1,688,150	1,457,258	1,163,137
Portuguese [3]	12,000	12,000	12,000	12,000	12,000
Japan—					
Japan proper [12]	515,103	665,096	479,908	637,169	668,647
Taiwan	101,540	138,000	239,200	136,200	[13] 196,734
Netherlands East Indies	133,522	170,246	150,636	132,026	427,683
Philippine Islands	31,247	69,345	76,194	28,919	30,683
Siam [13]	29,824	26,542	32,948	40,564	35,195
Turkey [3]	100,000	100,000	100,000	100,000	100,000
Africa:					
Algeria	18,255	20,208	25,079	23,541	27,005
Belgian Congo [3]	80	80	80	80	80
Egypt [4]	153,651	186,793	157,242	209,900	210,978
Eritrea [3]	20,000	20,000	20,000	20,000	20,000
Mauritius [3]	1,800	1,500	1,500	1,500	1,500
Nigeria [3]	400	400	400	400	400
Portuguese West Africa (Angola)	[4] 2,175	[3] 2,000	[3] 2,000	[3] 2,000	[3] 2,000
Somaliland—					
British [3]	15,000	15,000	15,000	15,000	15,000
French [3]	15,000	15,000	15,000	15,000	15,000
Southwest African Protectorate	[5]	[5]	[5]	340	432
Tanganyika Territory	[5]	2,427	1,918	4,629	4,000
Tunisia	32,800	51,950	72,982	123,606	128,442
Union of South Africa	62,033	75,806	62,170	70,369	59,269
Oceania:					
Australia—					
South Australia	57,399	49,438	51,093	63,693	79,507
Victoria [3]	40,000	40,000	40,000	40,000	40,000
Western Australia [14]	8,000	8,000	8,000	8,000	8,000

[3] Estimated annual production.
[4] Exports.
[5] Data not available.
[7] In 1924, in addition to the figures given above, 371,182 tons of salt in brine was reported for use in the manufacture of soda.
[8] Includes Asiatic Russia.
[9] Year ended Sept. 30.
[10] Brine-salt production of Ireland included with that of Great Britain. Separate data not available.
[11] Estimated on approximate gross revenue under Salt Gabelle.
[12] Fiscal year ended Mar. 31 of the year following that stated. The figures do not include output from salt beds which, though situated on Government beach lands, have no fixed areas.
[13] Exports for fiscal year ended Mar. 31 of the year following that stated.
[14] Estimated average annual exports.

LOCALITIES PRODUCING SALT IN THE UNITED STATES

The salt deposits in the United States that furnish salt for commercial purposes are, with the exception of small deposits used for local supply, confined to definite regions in the northeastern, south central, and western parts of the country. Michigan, New York, and Ohio, included in the first group, furnished 74 per cent of the total salt sold or used by producers in 1926. Kansas and Louisiana, in the central belt of States, are the next largest producers, and California is chief among the Western States.

A complete list of the producers in the United States with the situation of their plants was given in the report for 1925. During 1926 the Morton Salt Co. (Chicago, Ill.) built a plant at Newark, Alameda County, Calif., and manufactured refined salt. The Sierra Salt Co. (Chamber of Commerce Building, Los Angeles) reported the production of salt by solar evaporation at Salt Fields, Saline Valley, Inyo County, Calif., but no salt was marketed. The American Potash and Chemical Corporation (successor to the American Trona Corporation) which has produced and marketed salt in connection with its production of borax and potash at Trona, San Bernardino County, Calif., discontinued harvesting and shipping salt in July, 1926. In New York the Kerr-Remington Salt Co. (Inc.) succeeded the Alex. Kerr Bro. & Co. (Inc.), operating at Piffard, Livingston County, and the Remington Salt Co., operating on the east shore of Cayuga Lake at Ithaca, Tompkins County. The Sand Springs Chemical Co., Sand Springs, Tulsa County, Okla., manufactured salt for domestic use from brine obtained as a by-product from oil wells. This brine is evaporated by a process in which the brine is cooled by passing through a spray. Calcium chloride is also produced at this plant. The Texas Salt Co. (address, Houston, Tex.) reported that it opened a salt deposit at Hobby, Fort Bend County, Tex., during 1926, and that salt would be marketed during 1927. The Great Western Salt Co. succeeded the Gunnison Valley Salt Co., at Redmond, Sevier County, Utah. No changes were reported among the operators in Kansas, Michigan, Louisiana, and Ohio.

BROMINE

In 1926 the bromine recovered by the producers from natural brine and the bromine content of bitterns used by producers in the manufacture of bromine compounds was 20 per cent less than in 1925. The larger part of the bromine output as reported is not sold as bromine but as potassium and sodium bromide and other salts. The figures given in the table include the bromine content of these salts. The plants operated in 1926 were those of the Dow Chemical Co., Midland, Mich.; J. Q. Dickinson & Co., Malden, W. Va.; Liverpool Salt & Coal Co., Hartford, W. Va.; and Ohio River Salt Co., Mason, W. Va. So far as the Bureau of Mines is informed no bromine was produced directly from sea water in 1926 although experimental work in this direction continued. Extraction of bromine from bitterns produced at salt works on the California coast was reported as having begun late in 1926. Because of incomplete information, a small amount recovered in that year is not included in the figures given here.

Bromine and bromine in compounds sold or used by producers in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	895,499	$492,703	1922	1,005,174	$150,668
1918	1,727,156	970,099	1923	842,352	146,176
1919	1,854,971	1,234,969	1924	2,033,804	594,685
1920	1,160,584	745,381	1925	1,566,120	488,406
1921	711,953	172,759	1926	1,245,760	426,837

The values of bromine reported to the Bureau of Mines by the producers, representing receipts for the year f. o. b. at the plants, averaged 34 cents a pound in 1926, compared with 31 cents in 1925.

The wholesale price per pound of bulk bromine as quoted in the New York market in 1926, according to Chemical and Metallurgical Engineering, was 45 to 47 cents a pound throughout the year.

Imports of bromine compounds were not separately recorded by the Bureau of Foreign and Domestic Commerce prior to the change in tariff, September 22, 1922. The following table shows the imports of bromine into the United States from 1922 to 1926 and of bromine compounds since the change in tariff. Bromine had not been imported for several years before 1921; in that year the imports were 300 pounds, valued at $84.

Bromine and bromine compounds imported for consumption in the United States, 1922–1926

Product	1922		1923		1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bromine	1,094	$339	782	$1,171	37,318	$8,958	8,009	$2,110	37,839	$14,486
Potassium bromide	[1] 11,717	[1] 973	52,833	5,736	935,749	124,414	237,231	62,028	70,440	18,549
Sodium bromide	[1] 61,736	[1] 85,414	114,341	10,574	713,659	110,215	208,434	52,230	212,365	73,313
Other bromine compounds	[2]	[2]	4,123	1,581	52,408	13,071	117,867	46,784	271,645	102,894

[1] Figures cover Sept. 22 to Dec. 31, 1922; not separately recorded prior to change in tariff.
[2] Not separately classified prior to 1923.

CALCIUM CHLORIDE

The calcium chloride reported in the following table is an original constituent of the natural brine produced in connection with the manufacture of salt or salt and bromine from mineral raw materials only. The calcium chloride reported includes an output of mixed calcium and magnesium chlorides and other salts. There was an increase of 21 per cent in the quantity of this product sold by the producers in 1926 as compared with 1925, and 1926 was the fifth year of increase. A further large output of calcium chloride made by manufacturing processes used in chemical industries is not reported. The production in 1926 was by the California Rock Salt Co. (address, Los Angeles), Saltus, Calif.; the Dow Chemical Co., Midland, Mich.; Saginaw Salt Products Co. and Saginaw Chemical Co., Saginaw, Mich.; Pomeroy Salt Corporation (address, Pomeroy, Ohio), Minersville, Ohio; Sand Springs Chemical Co., Sand Springs, Okla.; J. Q. Dickinson & Co., Malden, W. Va.; Liverpool Salt & Coal Co., Hartford, W. Va.; and Ohio River Salt Co., Mason, W. Va.

Calcium (calcium-magnesium) chloride from natural brines sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	30,503	$451,480	1922	33,067	$571,326
1918	26,624	503,452	1923	44,961	663,384
1919	26,123	321,596	1924	58,791	1,164,848
1920	27,849	539,471	1925	67,870	1,386,639
1921	23,672	510,723	1926	82,340	1,710,405

Imports of calcium chloride were not separately recorded by the Bureau of Foreign and Domestic Commerce prior to the change in tariff September 22, 1922. The figures for imports since that time are shown in the following table:

Calcium chloride imported for consumption in the United States, September 22, 1922, to December 31, 1926

Year	Short tons	Value
1922 (Sept. 22 to Dec. 31)	740	$8,563
1923	3,232	48,527
1924	3,996	54,542
1925	2,253	37,121
1926	7,372	96,742

BARITE AND BARIUM PRODUCTS[1]

By R. M. Santmyers and A. Stoll[2]

Domestic crude barite, ground barite, lithopone, and barium chemicals sold or used by producers increased in amount in 1926 over 1925. The greatest gains were made in barium chemicals and ground barite, while lithopone and crude barite showed smaller percentages of increase.

CRUDE BARITE

SALES

Crude barite sold or used by producers in the United States, 1917–1926

Year	Short tons	Value f. o. b. at mine		Year	Short tons	Value f. o. b. at mine	
		Total	Average			Total	Average
1917	206,888	$1,171,184	$5.66	1922	155,040	$1,123,950	$7.25
1918	155,368	1,044,905	6.73	1923	214,183	1,664,156	7.77
1919	209,330	1,727,822	8.25	1924	196,332	1,540,744	7.85
1920	228,113	2,142,464	9.39	1925	228,063	1,703,097	7.47
1921	66,369	531,958	8.02	1926	237,875	1,773,293	7.45

The quantity of crude barite sold or used by producers during 1926 was the largest ever recorded in the history of the industry, exceeding the quantity in 1920, hitherto the largest, by 9,762 tons. As compared with 1925, the quantity and value each showed an increase of 4 per cent in 1926. Both Georgia and Missouri showed favorable increases over the year previous, while the quantity of barite from Tennessee decreased from 21 per cent of the total in 1925 to 9 per cent in 1926.

The amounts received by producers for crude barite in 1926 varied considerably in different States; thus, in Georgia the average was $6.86 per short ton, f. o. b. cars at mines, whereas in Missouri it was $7.96. The total average value, however, dropped 2 cents from 1925, in which year it was $7.47 per ton. This no doubt was caused by the great increase in the amount of crude barite imported into the country for consumption as compared with previous years.

[1] A chapter on barytes and barium products that was accompanied by a map showing the location of barite deposits and barium-product manufactories was given in Mineral Resources for 1915.

[2] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Crude barite sold or used by producers in the United States, 1925–26, by States

State	1925				1926			
	Short tons	Percentage of total	Value f. o. b. at mine		Short tons	Percentage of total	Value f. o. b. at mine	
			Total	Average			Total	Average
Georgia	65,936	29	$475,618	$7.21	77,654	33	$532,706	$6.86
Missouri	101,056	44	794,927	7.87	118,919	50	946,595	7.96
Tennessee	47,012	21	345,038	7.34	20,910	9	155,780	7.45
Other States [1]	14,059	6	87,514	6.22	20,392	8	138,212	6.78
	228,063	100	1,703,097	7.47	237,875	100	1,773,293	7.45

[1] 1925: Arizona, Nevada, North Carolina, South Carolina, Virginia, and Wisconsin; 1926: Arizona, California, Illinois, Kentucky, Nevada, South Carolina, Virginia, and Wisconsin.

STOCKS

The apparent stock of crude barite on hand at the mines at the end of December, 1926, was about 32,600 short tons, 16,000 of which were held in Georgia, 6,000 in Tennessee, 5,000 in Missouri, and the remainder in South Carolina, Virginia, California, and Kentucky. This is an increase over the stock held at the end of December, 1925, when 28,700 tons were in the hands of producers, Tennessee holding 9,800 tons, Georgia, 7,800 tons, Missouri, 4,900 tons, and the remainder being in several other producing States. These stocks do not take into consideration the crude barite held at the chemical and lithopone plants and at grinders as those lots are considered as marketed products and are shown under that heading in the sales of crude barite.

CONSUMPTION BY USES

The two tables that follow show the consumption of domestic and imported barite in the United States by uses and by States. The figures were compiled from reports made by the manufacturers of barium products.

The principal uses as shown in the next table are, in order of importance, as follows:

Lithopone is a white paint pigment consisting of a mixture of approximately 70 per cent barium sulphate and 30 per cent of zinc calculated as zinc sulphide. The zinc is present in lithopone as 26 to 28 per cent of zinc sulphide and 1 to 3 per cent of zinc oxide, according to conditions of manufacture.

Ground barite is used as a filler for the rubber, linoleum, oilcloth, and paper industry, and also in the paint industry where a white inert pigment is desired.

The third use of barite is for the manufacture of barium chemicals, of which barium sulphate (blanc fixe) is the most important; it is largely used where a pure white pigment or filler is desired, as in paints, rubber goods, linoleum, oilcloth, and glazed paper; also in lithographic inks; as a base for lake colors; and extensively as a pigment by the United States Navy in "battleship gray," which contains about 45 per cent barium sulphate.

Other chemicals are barium carbonate, chloride, nitrate, monoxide, hydroxide, binoxide, sulphide, sulphydrate, chromate, and chlorate.

Crude barite (both domestic and imported) used in the manufacture of barium products in the United States, 1917–1926, in short tons

Year	In manufacture of—			Total	Year	In manufacture of—			Total
	Ground barite	Lithopone	Barium chemicals			Ground barite	Lithopone	Barium chemicals	
1917	60,132	86,065	49,842	196,039	1922	48,280	94,259	25,303	167,842
1918	62,440	85,282	38,041	185,763	1923	47,713	128,547	34,327	210,587
1919	64,922	103,688	32,976	201,586	1924	42,855	137,127	33,181	213,163
1920	79,052	113,181	37,210	229,443	1925	56,851	146,693	29,141	232,685
1921	28,296	61,359	10,952	100,607	1926	69,048	178,889	33,119	281,056

Domestic and imported crude barite used in the manufacture of barium products in the United States in 1926, by States

State	Product manufactured	Plants	Barite used
			Short tons
Illinois	Lithopone and chemicals	6	55,740
Missouri	Ground barite and chemicals	4	72,492
New Jersey	Lithopone and chemicals	4	45,896
Pennsylvania	do	4	44,835
California, Delaware, and Maryland	Lithopone	3	62,093
Georgia	Ground barite	1	
South Carolina	do	1	
West Virginia	Chemicals	1	
		24	281,056

IMPORTS AND EXPORTS

Prior to the World War about 65 per cent of the domestic output of crude barite was mined in Missouri; the deposits in Georgia, Tennessee, and Kentucky were unable to compete with imported barite, chiefly from Germany. The imports from 1911 to 1915 averaged about 20,000 tons annually, but as the war progressed they practically ceased and the eastern fields, especially Georgia, took over the eastern market and soon dominated the barite production of the United States. During the past three years the order of production has again been reversed, and the Georgia and Tennessee fields are beginning to feel the effects of increasing imports. The imports during 1926 amounted to 51,016 short tons, valued at $195,004, or an average of $3.82 per ton, as compared with 28,655 tons, valued at $91,016, or $3.18 per ton, for 1925. Three companies reported using imported barite during 1926, the entire consumption of 46,424 tons being used for the manufacture of lithopone.

German crude barite can be laid down on the Atlantic seaboard for about $11 per short ton, including a tariff of $4 per ton, as compared with a cost price of about $7 per ton f. o. b. cars, Cartersville, Ga., district plus freight to the consumers in the East, which brings the total cost and freight price to somewhere in the neighborhood of $13 a ton for domestic crude barite. Producers in the Cartersville, Ga., and Sweetwater, Tenn., districts are finding it more difficult to dispose of their crude barite, and if it were not for the fact that most of the producers are also consumers of the mineral they might be compelled to close down. The following table shows the increase in the importation of crude barite during the past 10 years.

Crude barite imported for consumption in the United States, 1917–1926

Year	Short tons	Value [1]		Year	Short tons	Value [1]	
		Total	Average			Total	Average
1917	6	$63	$10.50	1922	23,239	$104,680	$4.50
1918				1923	15,045	93,721	6.23
1919	118	594	5.03	1924	21,502	104,264	4.85
1920	24,874	146,858	5.90	1925	28,655	91,016	3.18
1921	11,054	59,371	5.37	1926	51,016	195,004	3.82

[1] Value at port of shipment, on which duty is levied. Does not include railroad and ship freight charges to this country or import duty.

WORLD'S PRODUCTION

The following table, prepared by L. M. Jones, of the Bureau of Mines, shows the output of barite by various countries from 1922 to 1926, so far as statistics are available:

World's production of barite, 1922–1926, in metric tons

Country	1922	1923	1924	1925	1926
Algeria	1,200	700	500	600	(1)
Australia:					
New South Wales		102	152	203	(1)
South Australia	1,908	1,789	1,928	2,040	1,770
Western Australia (exports)	19				(1)
Austria	2,140	2,377	1,399	1,363	(1)
Belgium	1,480	6,770	20,490	13,190	(1)
Canada	262	371	137	86	19
France	12,634	26,061	44,189	41,450	(1)
Germany:					
Bavaria	16,139	19,970	23,029	21,477	(1)
Prussia	164,365	97,207	102,326	151,243	(1)
Saxony			2,076	968	(1)
Great Britain	41,606	44,195	55,646	49,462	(1)
India (British)	2,430	2,611	2,340	1,473	(1)
Italy	21,300	27,592	39,568	32,195	36,700
Japan	48	47			(1)
Rhodesia, Southern		9	64	36	27
Spain	[2] 7,705	[2] 18,434	[2] 14,450	[2] 8,784	(1)
United States	140,649	194,303	178,108	206,894	215,795

[1] Data not available.
[2] Includes the following quantities reported produced from quarries: 1922, 5,630 tons; 1923, 6,670 tons; 1924, 7,682 tons; 1925, 78 tons.

BARIUM PRODUCTS

The total quantity of barium products manufactured and sold in 1926 was 12 per cent larger than in 1925. The total value increased 7 per cent. The greatest growth was in the combined barium chemicals industry, which reported a gain of 17 per cent; sales of lithopone increased 10 per cent, and sales of ground barite increased 16 per cent.

Barium products made from domestic and imported crude ores in the United States and sold, 1925–26

Product	1925			1926		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Ground barite	49,674	$1,040,461	$20.95	57,812	$1,186,563	$20.52
Lithopone	145,019	15,186,147	104.72	159,931	16,062,197	100.43
Barium chemicals [1]	18,654	1,207,770		21,911	1,325,262	
	213,347	17,434,378		239,654	18,574,022	

[1] Barium chemicals manufactured from barium products bought in open market are not included in table in order to avoid duplication; the total output of barium chemicals is therefore not shown above.

REFINED GROUND BARITE

Sales of ground barite by producers in 1926 increased 16 per cent over sales in 1925. The center of the industry is in Missouri, where 30,876 short tons of crude barite were ground in 1926.

There were two grinding plants in operation in the southern barite field during the year. These were at Cartersville, Ga., and Kings Creek, S. C. The plant at Cartersville is contemplating the addition of several water wheels to increase its present power supply which is 900 kilowatts. Other remodeling work is being carried on as rapidly as is consistent without interrupting production.

Paint manufacturers use a large part of the ground barite output. Other uses are found for it in the rubber trade, for X-ray protection purposes, in storage batteries, among brass smelters, and by various chemical industries. A new use has been developed in the manufacture of inside-frosted electric-lamp bulbs. Baroid, a special form of barium sulphate, is sold by the National Pigments & Chemical Co. It is used in the drilling of oil wells to seal off gases and thus prevent "blow-offs."

Ground barite sold by producers in the United States, 1917–1926

Year	Number of plants	Short tons	Value		Year	Number of plants	Short tons	Value	
			Total	Average				Total	Average
1917	7	52,694	$951,220	$18.05	1922	7	46,176	$933,722	$20.22
1918	9	55,086	1,041,608	18.91	1923	6	39,605	895,095	22.60
1919	9	[1] 57,985	[1] 1,163,437	20.06	1924	5	38,296	784,881	20.50
1920	8	65,748	1,381,868	21.02	1925	5	49,674	1,040,461	20.95
1921	7	27,661	622,871	22.52	1926	5	57,812	1,186,563	20.52

[1] Figures cover production, not sales.

LITHOPONE

The sales of lithopone by producers in 1926 did not show as large an increase over 1925 as those in 1925 did over those in 1924. However, the production and sales during the year were the largest ever recorded in the industry.

With the exception of one or two years there has been a steady increase in sales since 1917, as will be noticed in the following table. The value, however, has shown great variation, the average during 1926, $100.43 a ton, being the lowest shown in the period.

Lithopone sold by producers in the United States, 1917–1926

Year	Number of plants	Short tons	Value		Year	Number of plants	Short tons	Value	
			Total	Average				Total	Average
1917	13	63,713	$7,406,896	$116.25	1922	13	83,360	$9,214,040	$110.53
1918	11	62,403	7,923,276	126.97	1923	11	98,199	11,608,443	118.21
1919	15	78,365	10,218,850	130.40	1924	11	109,469	12,531,397	114.47
1920	17	89,373	12,484,925	139.69	1925	11	145,019	15,186,147	104.72
1921	15	55,016	6,681,563	121.45	1926	13	159,931	16,062,197	100.43

BARIUM CHEMICALS

In 1926 the total sales by producers of barium chemicals produced from barite increased 17 per cent over those of 1925. Sales of barium carbonate increased from 4,962 tons, valued at $279,346, in 1925 to 5,394 tons, valued at $298,121, in 1926.

One of the new barium-chemical plants which started operations during the latter part of the year was the Barium Products Co., with a plant at Modesto, Stanislaus County, Calif. The chief product of this plant is 1½ tons of barium peroxide a day, which is shipped to a hydrogen peroxide plant at San Francisco. The crude barite for the operation of the plant is obtained from mines at Hawthorne, Nev.

Barium chemicals sold by producers in the United States, 1925–26

Chemical	1925			1926		
	Short tons	Value		Short tons	Value	
		Total	Average		Total	Average
Barium carbonate	4,962	$279,346	$56.30	5,394	$298,121	$55.27
Barium chloride	(1)	(1)	(1)	4,592	279,510	60.87
Barium sulphate (blanc fixe)	11,748	792,036	67.42	11,925	747,631	62.69
Other [2]	1,944	136,388	70.16			
	18,654	1,207,770		21,911	1,325,262	

[1] Included under "Other".
[2] 1925: Chloride, hydroxide, and sulphide; 1926: Hydroxide and sulphide.

Barium chemicals sold by producers in the United States, 1917–1926, in short tons

Year	Barium carbonate	Barium chloride	Barium sulphate (blanc fixe)	Other barium chemicals [1]	Year	Barium carbonate	Barium chloride	Barium sulphate (blanc fixe)	Other barium chemicals [1]
1917	8,238	4,870	6,314	3,081	1922	2,281	2,022	7,349	2,249
1918	7,661	4,530	9,522	1,473	1923	6,362	3,301	6,761	379
1919 [2]	7,135	4,509	5,227	3,142	1924	6,058	3,859	7,796	441
1920	7,484	3,084	8,046	2,146	1925	4,962	(3)	11,748	1,944
1921	1,956	(2)	2,471	1,060	1926	5,394	4,592	(3)	11,925

[1] 1917–18 and 1920: Binoxide, hydroxide, nitrate, and sulphide; 1919: Binoxide, nitrate, and sulphide; 1921 and 1925: Chloride, hydroxide, and sulphide; 1922: Binoxide, hydroxide, sulphide, and sulphydrate; 1923–24: Hydroxide and sulphide; 1926: Hydroxide, sulphate, and sulphide.
[2] Figures cover production, not sales.
[3] Included under "Other barium chemicals."

IMPORTS AND EXPORTS

The quantities of barium products imported in 1926 compared with figures for 1925 are as follows: Ground barite increased 4 per cent, lithopone increased 37 per cent, and the barium chemicals increased 20 per cent, barium binoxide, chloride, and nitrate being the only products showing a decrease from the year before.

The exports of lithopone in 1926 were 1,941 short tons, valued at $200,412, or $103.25 per ton, an increase of 51 per cent in both quantity and value over 1925.

Barium compounds imported for consumption in the United States, 1921–1926

[Value at port of shipment]

Year	Ground barite			Lithopone			Barium binoxide		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average per ton		Total	Average per pound		Total	Average per pound
1921	1,002	$16,942	$16.91	5,247	$432,019	$0.041	669	$127,631	$0.095
1922	4,696	59,453	12.66	10,763	885,671	.041	1,009	189,334	.094
1923	6,022	88,741	14.74	10,440	776,383	.037	905	152,270	.084
1924	2,830	38,292	13.53	6,830	543,025	.040	860	120,374	.070
1925	3,203	40,008	12.49	6,330	478,395	.038	635	70,553	.056
1926	3,347	44,781	13.38	8,686	661,700	.038	49	8,157	.083

Year	Blanc fixe (precipitated barium sulphate)			Artificial barium carbonate (chemically precipitated)			Natural barium carbonate (ground witherite)		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average per pound		Total	Average per pound		Total	Average per pound
1921	769	$22,470	$0.015	2,238	$80,603	$0.018	668	$25,188	$0.019
1922	2,187	76,445	.017	5,212	210,250	.020	1,472	39,114	.013
1923	587	32,063	.027	1,901	79,482	.021	1,557	41,823	.013
1924	1,047	50,465	.024	3,752	128,217	.017	2,500	56,415	.011
1925	1,996	81,439	.020	7,188	160,164	.011	2,390	63,634	.013
1926	2,973	136,697	.023	9,224	189,167	.010	3,380	80,679	.012

Year	Barium chloride			Barium nitrate			Barium hydroxide		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average per pound		Total	Average per pound		Total	Average per pound
1921	2,186	$72,621	$0.017	[1]	[1]		[1]	[1]	
1922	1,962	112,785	.029	[2] 179	[2] $16,795	$0.047	[2] 73	[2] $6,573	$0.045
1923	1,278	75,014	.029	511	59,766	.058	181	16,872	.047
1924	2,330	100,810	.022	513	54,638	.053	174	8,241	.024
1925	2,167	67,306	.016	703	58,192	.041	120	5,605	.023
1926	1,773	49,426	.014	602	49,494	.041	236	9,789	.021

[1] Not separately recorded prior to the tariff of Sept. 22, 1922.
[2] Sept. 22 to Dec. 31.

Lithopone exported from the United States, 1922–1926 [1]

Year	Short tons	Value		Year	Short tons	Value	
		Total	Average			Total	Average
1922	1,616	$169,982	$105.19	1925	1,287	$132,771	$103.16
1923	1,485	176,624	118.94	1926	1,941	200,412	103.25
1924	923	104,783	113.52				

[1] Not separately recorded prior to 1922.

MARKETS AND PRICES

The market for barite displayed rather an even tone throughout the year on both the domestic and imported material. Demand was along well-defined lines, and the 1926 schedule of quotations was left unchanged at the end of the year.

The lithopone market during the first three quarters of the year was pretty well stabilized in sympathy with zinc sulphate, but rumors of an impending price cut in zinc were heard in the trade as the market went into the closing quarter. At the beginning of the last quarter, however, producers of lithopone named an open market quotation, and business picked up immediately, with the result that manufacturers sold on contract a large part of their expected production for the first half of 1927. The net results of the flurry in the lithopone market appear to have been the placing of the smaller buyers on a better competitive basis with the large quantity buyers, in that the quantity price has been made available to a greater number of buyers than ever before.

The price trend on dry blanc fixe closely paralleled that of the preceding year, and actual quotations during the year show little variation from the 1925 schedule. A good movement was reported during the year.

The presence of large stocks of foreign barium chloride in the market during the early part of the year resulted in a reduction of the price. The market pursued an irregular trend for some weeks, but the continuation of the German syndicate to limit the export sales of barium products resulted in higher quotations on imported barium chloride and carbonate. However, while there was excellent precedent abroad for higher prices here for imported barium porducts, conditions in the local market did not favor the values and they were indifferently maintained. The domestic manufacturers have been making changes in the prices of these products as infrequently as they could, and the steadiness and dependability of their shipments won a greater following as the year advanced than the lower prices for the imported material.

The accompanying table gives the range of quotations on barite and the barium products, 1924 to 1926. Quotations on crude and ground barite are taken from the Engineering and Mining Journal and represent prices in Missouri; quotations on lithopone and barium chemicals are taken from Oil, Paint, and Drug Reporter and represent prices at New York.

Range of quotations on barite and barium products, 1924–1926

	Unit	1924	1925	1926
Crude barite	Short ton	$8.00 –$9.00	$8.50	$8.00 –$8.50
Ground barite	do	22.00 –26.00	$22.00 –23.00	23.00
Lithopone	Pound	.06⅜– .08⅝	.06½– .06⅝	.05⅞– .06⅝
Barium carbonate	Short ton	63.00 –90.00	54.00 –65.00	50.00 –55.00
Barium chlorate	Pound	.14 – .15	.14 – .15	.14 – .15
Barium chloride	Short ton	70.00 –95.00	60.00 –72.50	60.00 –66.00
Barium nitrate	Pound	.08 – .10	.08 – .09	.07½– .09
Barium sulphate (blanc fixe), dry	do	.04 – .05	.04 – .05	.04 – .04½
Barium sulphate (blanc fixe), pulp	Short ton	50.00 –70.00	55.00 –70.00	53.00 –65.00

The following are the designations on which quotations in the preceding table are based:

Crude barite, "f. o. b. mines."
Ground barite, "water ground and floated, bleached, f. o. b. works."
Lithopone, "in barrels, l. c. l."
Barium carbonate, "bags, works."
Barium chlorate, "kegs."
Barium chloride, "crystals, bags."
Barium nitrate, "casks."
Barium sulphate (blanc fixe), "dry, in barrels, l. c. l."
Barium sulphate (blanc fixe), "pulp, works."

PRODUCERS

Producers of barium products in the United States active in 1926 are listed below, with the addresses of their main offices and the locations of their plants.

Ground barite:	
Clinchfield Sand & Feldspar Co., Baltimore, Md	Kings Creek, S. C.
C. P. DeLore Co., St. Louis, Mo	Mississippi River and River Des Peres, St. Louis, Mo.
National Pigments & Chemical Co., St. Louis, Mo	St. Louis, Mo.
Point Milling & Manufacturing Co., East St. Louis, Ill	Mineral Point, Mo.
Thompson, Weinman & Co., New York, N. Y	Cartersville, Ga.
Lithopone:	
Chemical & Pigment Co. (Inc.), care The Glidden Co., Cleveland, Ohio	Oakland, Calif.
Do	Collinsville, Ill.
Do	St. Helena, Md.
E. I. du Pont de Nemours & Co., Wilmington, Del	Newark, N. J.
Do	Philadelphia, Pa.
Eagle-Picher Lead Co., Chicago, Ill	Argo, Ill.
Grasselli Chemical Co., Cleveland, Ohio	Grasselli, N. J.
Krebs Pigment & Chemical Co., Newport, Del	Newport, Del.
Mineral Point Zinc Co., care New Jersey Zinc Co., New York, N. Y	Depue, Ill.
New Jersey Zinc Co. (of Pennsylvania), New York, N. Y	Palmerton, Pa. (2 plants)
Sherwin-Williams Co., Cleveland, Ohio	Chicago, Ill.
United Color & Pigment Co., Newark, N. J	Newark, N. J.
Barium chemicals: [3]	
Alton Barium Products Co., Alton, Ill	Alton, Ill.
Barium Reduction Corporation, Charleston, W. Va	South Charleston, W. Va.
Bertha Mineral Co., care New Jersey Zinc Co., New York, N. Y [4]	Sweetwater, Tenn.
Chicago Copper & Chemical Co., Chicago, Ill	Blue Island, Ill.
E. I. du Pont de Nemours & Co., Wilmington, Del	Philadelphia, Pa.
Grasselli Chemical Co., Cleveland, Ohio	Grasselli, N. J.
Titanium Pigment Co. (Inc.), New York, N. Y	Carondelet Station, St. Louis, Mo.

[3] Includes only those using barite.

[4] Sales only.

GRAPHITE

By Jefferson Middleton

INTRODUCTION

During 1926 the graphite industry in the United States advanced on the whole, although there was no increase in the number of producers reporting, and no new States actually began production. In Idaho a small experimental shipment of amorphous graphite was reported as having been made, and in New Jersey development work was reported on a deposit of crystalline graphite at or near Annandale, Hunterdon County. Montana, which reported sales of graphite in 1925, reported none in 1926. The quantity and value of natural graphite sold or used by producers was larger than in 1925. The increase in quantity was in the crystalline variety; the quantity of amorphous graphite sold or used by producers in 1926 decreased, but its value increased slightly, compared with 1925. The sales of crystalline graphite in 1926 more than doubled in quantity and more than tripled in value compared with 1925, and were the largest since 1920; the quantity of amorphous graphite sold or used by producers was the smallest since 1922.

The continued high price of foreign graphite has apparently stimulated the production of domestic crystalline graphite, especially in the Alabama field. Two operators reported sales of graphite there in 1926; a third reported development work with probable shipments in 1927.

The price of Ceylon graphite continued high throughout 1926. The price of Madagascar graphite in New York, including duty, ranged from 6½ to 8 cents per pound.

USES

Natural graphite is used chiefly in the manufacture of foundry facings, pigments and paints, crucibles, pencils, commutator brushes, stove polish, lubricants, retorts, and batteries. During the last few years the use of graphite in the United States has undergone radical changes. Uses that a few years ago consumed a large proportion of the supply are now relatively of minor importance, and uses which were unimportant have become important. Before the World War the manufacture of graphite crucibles consumed more than one-half of the supply; in 1923 only 15 per cent of the graphite used in the manufacture of finished products was used in the manufacture of crucibles and in 1924 only 13 per cent. Foundry facings used only 10 per cent of the graphite in 1913; the quantity so used in 1923 was 44

per cent and in 1924 it was 52 per cent. Other uses that were minor before the war and are now of much importance are pigments and paints, pencils and crayons, commutator brushes, stove polish, and lubricants.

PRODUCTION

The natural graphite sold or used by producers in the United States increased from 4,665 short tons in 1925 to 5,470 tons in 1926, a gain of 805 tons, or 17 per cent, compared with 1925. The quantity of amorphous graphite, which in 1926 constituted 54 per cent of the total output, declined 561 tons, or 16 per cent, compared with 1925. The output of crystalline graphite increased 2,731,950 pounds, or 121 per cent. The total value of amorphous graphite rose slightly—$860, or 2 per cent—and the value of the crystalline variety increased $122,121, or 215 per cent, compared with 1925. The States producing amorphous graphite in 1926 were Michigan, Nevada, and Rhode Island; the States producing crystalline graphite were Alabama and Texas. Rhode Island was the largest producer of amorphous graphite and Texas the larger producer of crystalline graphite.

Natural graphite sold or used by producers in the United States, 1917–1926

Year	Number of operators reporting sales	Amorphous		Crystalline		Total value
		Short tons	Value	Pounds	Value	
1917	33	8,301	$73,481	10,584,080	$1,094,398	$1,167,879
1918	42	6,560	69,455	12,861,839	1,454,799	1,524,254
1919	20	3,379	47,716	8,086,191	731,141	778,857
1920	17	4,694	49,758	9,632,360	576,444	626,202
1921	8	1,842	20,860	1,189,523	75,664	96,524
1922	7	2,200	(1)	1,849,766	85,242	(1)
1923	7	4,056	39,560	3,964,900	151,434	190,994
1924	5	4,071	38,533	1,800,325	48,977	87,510
1925	6	3,536	39,640	2,257,250	56,721	96,361
1926	6	2,975	40,500	4,989,200	178,842	219,342

[1] Bureau of Mines not at liberty to publish value.

CONSUMPTION

The apparent consumption of natural graphite in the United States in 1926 was 21,231 short tons. Nearly 24 per cent of this total was domestic graphite. In 1925 the apparent consumption was 21,488 tons, of which 17 per cent was domestic graphite. Assuming that exports of graphite in 1926 were composed of amorphous and crystalline in the same ratio as was production, the new supply of amorphous graphite available for consumption in the United States was 11,006 tons and the amount of crystalline graphite was 10,225 tons.

MANUFACTURED GRAPHITE

Graphite is manufactured by the Acheson Graphite Co., at Niagara Falls, N. Y. The figures that follow are published by permission of this company.

Graphite manufactured by the Acheson Graphite Co., 1917–1926, in pounds

1917	10, 474, 649	1922	13, 031, 926
1918	9, 182, 272	1923	26, 761, 015
1919	8, 163, 177	1924	10, 986, 192
1920	7, 399, 749	1925	12, 135, 655
1921	5, 888, 000	1926	21, 163, 986

PRICES

In 1926 the average value of domestic crystalline graphite at the mine ranged from about 3 to 6 cents a pound, compared with 2½ to 10 cents in 1925 and 2 to 3 cents in 1924.

The following table is based on information supplied prior to 1920 by importers; since then the figures have been furnished by Charles Pettinos, of New York.

Average prices of Ceylon graphite c. i. f. New York, 1917–1926, in cents per pound

Year	Lump		Chip		Dust		Remarks
	First grade	Second grade	First grade	Second grade	First grade	Second grade	
1917	28 –32	21 –23	20 –23	17 –19	11 –13	10 –12	High level maintained throughout the year.
1918	15¼–28½	14 –22	12½–21½	11 –18½	10½–12	9 –10	High first half; low second half.
1919	14 –15¼	12 –13	10 –11	8 –9	6¾– 7½	5 – 6	Low throughout the year.
1920	9 –14	7 –11	7 –10	5½– 7½	5 – 7	3½– 5	High first half; low second half.
1921	5½– 6	4½– 5	4½– 5	3½– 4	3¼– 3¾	2 – 2½	Low throughout the year.
1922	5 – 6	4 – 4½	3¾– 4¼	3¼– 3¾	3 – 3½	2 – 2½	Do.
1923	5 – 6	4 – 4½	3¾– 4¼	3¼– 3¾	3 – 3½	2 – 2½	Do.
1924	5½– 7	4½– 6	4 – 6	3½– 5	3¼– 4½	2 – 3	Low first three-quarters; high last quarter.
1925	7½– 9½	6½– 8½	6½– 7½	5½– 6½	3½– 5½	3 – 4½	High throughout the year.
1926	7½– 9½	6½– 8½	6½– 7½	5½– 6½	3½– 5½	3 – 4½	Do.

Madagascar.—The following information has also been furnished by Mr. Pettinos: The price range for 1926 for Madagascar graphite was from 6½ to 8 cents per pound, exdock at New York, including duty and other charges. The high price prevailed during the first half of the year and the low price during the last half.

The exports from Madagascar are virtually all of one quality, called "Standard No. 1 Flake," the grade that the French Government is attempting to have the producers maintain, with a graphitic carbon content of approximately 85 per cent. The size of grain runs from 20 to 60 mesh; all should pass the 20-mesh and remain on the 60-mesh screen.

IMPORTS AND EXPORTS [1]

The reports of the Bureau of Foreign and Domestic Commerce on imports show only the country from which the graphite is shipped, and that is not always the country of origin. For instance, the graphite shown as imported from France probably originated in Madagascar, and that imported from Great Britain should probably be credited to Ceylon and possibly in part to Madagascar. The shipments from Japan probably consisted of graphite from Chosen.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

In 1926 the quantity of graphite imported for consumption decreased 1,602 tons, or 9 per cent, but the value increased $94,823, or 11 per cent, compared with 1925. Amorphous graphite in 1926 constituted slightly more than one-half of the total quantity imported and the crystalline graphite 82 per cent of the total value of imports. The small part of the total value of imports represented by amorphous graphite is at least partly accounted for by the fact that the large imports from Mexico are crude amorphous graphite.

Graphite imported for consumption in the United States, 1917–1926, by kinds

Year	Amorphous		Crystalline chip or dust		Crystalline flake		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	(1)	(1)	(1)	(1)	(1)	(1)	42,577	$8,961,988
1918							19,498	3,092,475
1919							26,626	2,978,096
1920							21,095	1,711,312
1921							8,183	452,076
1922							12,488	473,046
1923	11,252	$149,831	7,243	$426,417	939	$37,871	19,434	614,119
1924	10,936	113,751	3,998	197,867	1,441	87,893	16,375	399,511
1925 [2]	9,210	143,750	5,904	389,242	2,654	293,418	17,768	826,410
1926 [2]	8,250	161,564	5,258	433,848	2,658	325,821	16,166	921,233

[1] Not separately classified prior to 1923.
[2] Imports of graphite crucibles were not separately classified until 1925, when 3,100 crucibles, valued at $548, were imported; corresponding imports for 1926 were 9,513 crucibles, valued at $11,780. Weight not recorded.

Graphite imported into the United States, 1921–1926

[General imports]

Country	1921		1922		1923	
	Short tons	Value	Short tons	Value	Short tons	Value
Aden					111	$1,489
Austria					59	1,364
Canada	687	$48,035	533	$17,392	893	37,384
Ceylon			7,114	324,826	7,244	392,350
China	1	95				
Chosen	15	203			1,705	24,262
Colombia	9	676				
Denmark					1	50
France	1,078	67,506	1,305	52,275	843	32,176
French Indo-China	(1)	3				
Germany			6	425	4	389
Greenland					67	600
Hong Kong	(1)	4				
India:						
British	(1)	22	102	6,852	298	23,059
Other British East	2,259	194,177				
Italy	47	1,019	35	1,045	474	7,487
Japan	632	14,942	1,171	29,819	2,106	34,912
Madagascar					183	5,146
Mexico	3,404	120,153	2,196	40,954	5,765	41,339
Netherlands			(1)	4		
Siam					56	2,929
United Kingdom: England	51	5,241	144	7,369	8	1,400
	8,183	452,076	12,606	480,961	19,817	606,336

[1] Less than 1 ton.

Graphite imported into the United States, 1921–1926—Continued

Country	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Austria	5	$180				
Canada	1,137	58,628	2,268	$123,823	2,633	$178,249
Ceylon	3,632	171,804	5,616	365,371	4,795	390,336
China	253	3,905	88	1,502		
Chosen	251	2,768	439	5,330	[2]	[2]
France	851	57,009	2,052	230,056	723	96,811
Germany	2	282	25	3,256	126	13,217
India (British)	171	8,450	5	150	122	8,170
Italy	155	3,204	575	16,688	105	2,291
Japan	479	8,362	191	9,983	[2] 880	[2] 21,794
Java and Madura					61	4,041
Madagascar	429	11,145	168	10,466	1,014	108,846
Mexico	8,984	70,380	6,159	39,119	5,238	45,968
Norway					14	2,078
Switzerland	17	1,944	13	1,600		
United Kingdom:						
England	9	1,450	180	20,738	483	51,712
Scotland						
	16,375	399,511	17,779	828,082	16,194	923,513

[2] Chosen included with Japan.

Graphite exported from the United States, 1917–1926

Year	Unmanufactured graphite		Manufactures of graphite	Year	Unmanufactured graphite		Manufactures of graphite
	Short tons	Value			Short tons	Value	
1917	2,573	$349,563	$891,687	1922	569	$78,094	[1] $255,019
1918	954	121,555	731,518	1923	908	138,542	[1] 335,778
1919	629	90,185	788,755	1924	1,022	144,108	[1] 250,957
1920	607	112,771	610,261	1925	945	142,122	[1] 337,481
1921	921	95,998	679,359	1926	405	49,235	[1] 463,084

[1] Exclusive of crucibles, figures for which are not available.

In 1926 the exports of unmanufactured graphite, which were equivalent to more than 7 per cent of the domestic production, decreased 57 per cent in quantity and 65 per cent in value, compared with 1925. The average value per pound at the port of export declined from 7.52 cents in 1925 to 6.08 cents in 1926. The value of manufactures of graphite (exclusive of crucibles) exported rose 37 per cent in 1926, compared with 1925, and was higher than in any other year since 1921. Exports of lead pencils are not included in the table showing the value of manufactures of graphite, nor are exports of crucibles included after 1921. Exports of pencils and pencil leads (including refillable pencils) in 1926 were 10,016,581 dozen, valued at $2,144,614, compared with 10,364,349 dozen, valued at $2,186,772, in 1925. The official classification for export statistics contains the group "Crucibles, clay and graphite," and exported under this heading in 1926 were 618,735 crucibles, valued at $149,456. The corresponding figures for 1925 were 408,249 crucibles, valued at $91,699.

WORLD'S PRODUCTION

The table following shows, so far as figures are available, the production of graphite throughout the world in 1922 to 1926. The most striking features of this table are the increase in exports from Chosen, the decrease in exports from Ceylon and Madagascar, and the decline in production in Mexico.

World's production of natural graphite, 1922–1926, in metric tons [1]

Country	1922	1923	1924	1925	1926
Australia:					
New South Wales	51				
Northern Territory			3		
Austria	14,034	9,403	9,523	13,079	14,756
Canada	542	1,010	1,210	2,331	2,474
Ceylon [2]	11,024	10,840	9,806	15,674	11,810
Chosen [2]	19,330	13,576	16,032	15,040	18,692
Czechoslovakia	10,500	9,873	11,935	18,086	[3]
France		190	514	1,139	[3]
Germany	32,342	20,856	10,079	16,853	[3]
Greenland [4]	432	60	53	32	
India (British)	20				[3]
Indo-China			2,264	[4] 221	[3]
Italy	4,546	5,691	7,740	9,937	9,605
Japan	1,046	801	767	1,010	[3]
Madagascar [2]	6,675	10,768	11,556	14,980	11,454
Mexico (amorphous)	2,054	5,489	8,023	5,839	4,435
Spain	530			1,945	603
Union of South Africa	38	54	50	47	46
United States:					
Amorphous	1,996	3,680	3,693	3,208	2,699
Crystalline	839	1,798	816	1,024	2,263

[1] Compiled by L. M. Jones, of the Bureau of Mines.
[2] Exports.
[3] Data not available.
[4] Concentrates.

The following extract from The (London) Mining Journal of May 7, 1927, in regard to graphite mining in Ceylon may be of interest.

In his * * * annual report for the year 1926 * * * the chief inspector of mines, Ceylon, states that the improvement in the plumbago mining industry recorded in the previous report was not maintained throughout the year. The quantity exported was 232,352 hundredweight, valued at Rs.-2,616,994, as compared with 305,608 hundredweight, valued at Rs.2,983,389, during 1925. America was, as usual, the largest buyer with 89,917 hundredweight, against 115,393 hundredweight in 1925, a decrease of 25,476 hundredweight. Shipments to Germany during the year were 35,234 hundredweight, or a decrease of 50,234 hundredweight, while shipments to Great Britain amounted to 58,376 hundredweight, showing an increase of 7,014 hundredweight. The market for all grades fell considerably as the year progressed, but a better demand is anticipated during the current year, with a consequent improvement in prices. It is gratifying to note that government have continued to waive the export duty on plumbago, and thus helped the industry to the extent of Rs.78,510, which represents 3 per cent ad valorem on the value of the exports. In addition to this, government allowed free import of explosives for mining purposes.

The total number of declarations received was 603, but these were mostly sent in during the earlier months, very few being received in the latter months. This falling-off was particularly noticeable in connection with the Southern Province, where as many as 342 new declarations were made to work new mines, and yet only six small mines were reported as working at the end of the year.

The total number of mines reported to be working at the end of the year was 65, with about 2,359 men employed. In July the number of working mines are reported to be 134. Of these 65 working mines 30 are of such small dimensions as to be employing less than 10 men at each, and there are only 20 mines in all which report employing more than 20 men.

A proposal to exploit new areas for the mining of plumbago is now being considered by the Ceylon Merchants' Chamber, who view the present unsatisfactory condition of the industry with some concern. It is understood that government will be approached with a view to securing the mineral rights on certain Crown lands already sold to private owners in the Kalutara and Kelani Valley districts.

The graphite industry in Madagascar in 1926 is described by Vice Consul Thompson as follows: [2]

During 1926 Madagascar produced 15,903 metric tons of graphite, in comparison with 13,005 during 1925—an increase of about 22 per cent—while exports showed a decrease from 14,980 tons in 1925 to 11,454 in the following year, according to figures compiled by the Madagascar Service of Mines. This export figure for 1926 is larger, however, than preliminary estimates of 10,000 tons, offered in December, and it appears likely that the total just published will yet prove a little high. The service of mines gives the stock of graphite on hand December 31, 1926, finished and ready for shipment, at 5,300 tons, which would indicate a total export of about 10,600 tons.

Undoubtedly production was stimulated by the high prices prevailing incident to the practical control of the local price situation by the British-owned Maskar Co., which figures on a pound-sterling basis. During the first three quarters of 1926 quotations for 85 per cent graphite laid down at Tamatave ranged from 2,600 to 3,000 francs per ton, not falling below 2,400 francs until about November 15. The revalorization of the franc, which took place in the last three months, lowered the prices paid for graphite on the local market and slowed down exports somewhat, but its effect was not of great importance to the general status of this product, and was not greatly felt beyond the opening of 1927.

The greatest obstacle was the native labor problem. Such labor was scarcer and demanded high wages, owing to a general rise in the cost of living in Madagascar, felt particularly during the second half of the year.

The Maskar Co., which dominates the local market, at present is paying 1,900 francs per metric ton for 85 per cent graphite laid down at the warehouse, Tamatave—a reduction of about 100 francs per ton from the current price at the opening of the year. This company estimates that such graphite is worth about 2,600 francs per ton landed at Marseille.

An estimate of the Compagnie Générale de Madagascar in January, 1927, gave the production cost f. o. b. Tamatave for 85 per cent graphite at 1,450 francs per ton for the Antsirabe region, 1,750 for the Anivorano region, and 975 for the Vatomandry region. The wide range is due to the great differences in labor and transport costs in the various localities, which tend to equalize to some degree, as labor is usually more plentiful and cheaper in the more inaccessible parts. The Maskar Co. estimates a production cost of about 1,600 francs per ton for the Ambositra region, somewhat more inaccessible than Antsirabe.

[2] Commerce Reports, U. S. Department of Commerce, May 9, 1927, No. 19, p. 360.

SLATE

By A. T. Coons

SUMMARY

Slate sold by producers in the United States in 1926 was valued at $12,352,767, a decrease of 2 per cent from the value for 1925. The quantity of slate sold, which was approximately 718,000 short tons in 1926, represented a decrease of 1 per cent.

Roofing slate, which had increased 5 per cent in quantity of sales in 1925 as compared with 1924, decreased 6 per cent in 1926. The total value of roofing slate in 1926 was virtually the same as in 1925. The average value per square in 1924 was $9.86; in 1925, $10.28; in 1926, $10.90. A strike in the New York-Vermont district in 1925 and 1926 somewhat affected the output of roofing slate.

Total sales of mill stock in 1926 declined 7 per cent in quantity from 1925. The decrease was chiefly in the slate sold for blackboards and bulletin boards, which had shown considerable increase in 1925. Sales of slate for grave vaults and covers and for school slates also declined. Sales of electrical slate increased 12 per cent, structural and sanitary slate increased 11 per cent, and slate for use as billiard-table tops 8 per cent. Sales of slate used for flagstones, crosswalks, stepping-stones, etc., have increased in the last few years, and 35 per cent more was sold in 1926 than in 1925.

Sales of crushed slate in the form of granules and slate flour were about the same in 1926 as in 1925. The average value decreased from $6.45 a short ton in 1925 to $6.04 in 1926. Other stone, chiefly a "greenstone" which is an altered diabase, crushed into granules and sold in 1926 amounted to 91,530 short tons, valued at $626,583, as shown in the chapter on stone.

The slate-quarrying companies that reported operation in 1926 numbered 122, or 4 more than in 1925. In New York and Vermont many small quarries are intermittently worked on a small scale for roofing slate. The product of these quarries is generally sold with that of some of the larger quarries, and much of it consists of "freak" or odd-colored slate of unusual size or thickness for use in special work.

As slate from many of the small producers is sold by the larger producing companies, the possibility of duplication of returns must be considered in the compilation of operators' reports. In the compilation of this report special care has been taken to avoid duplication.

PRODUCTION

The following tables show sales of slate, by uses, from 1917 to 1926. In approximating the tonnage for the different slate products given in the second table a specific gravity of 2.75 has been used as the basis of calculation, and thicknesses ranging from three-sixteenths inch to 2 inches corresponding to the averages for the several products. The total quantity and value given for each use are the totals of the reports of the quarrymen (not the selling agents), and the value is that f. o. b. quarry or nearest point of shipment. Some of the mill stock may ultimately be used for purposes other than those reported by the quarrymen.

Slate sold by producers in the United States, 1917–1926, by uses

[Value is at point of shipment]

Year	Roofing slate		Mill stock		Other uses[1] (value)	Total value
	Squares (100 square feet)	Value	Square feet	Value		
1917	703,667	$3,411,740	10,663,000	$1,799,917	$538,309	$5,749,966
1918	379,817	2,219,131	7,204,000	1,853,603	768,386	4,841,120
1919	454,337	3,085,957	7,466,000	1,782,793	1,161,898	6,030,648
1920	396,230	3,524,658	9,910,000	3,147,281	2,054,503	8,726,442
1921	348,085	3,197,745	8,970,000	2,719,723	1,404,538	7,322,006
1922	479,243	4,069,761	9,276,800	2,899,195	2,207,828	9,176,784
1923	507,587	4,582,535	11,109,480	4,159,644	3,334,445	12,076,624
1924	469,393	4,626,614	10,009,180	3,922,366	3,227,036	11,776,016
1925	494,530	5,084,945	11,077,860	4,231,477	3,258,904	12,575,326
1926	465,900	5,079,087	10,278,130	4,191,185	3,082,495	12,352,767

[1] Chiefly slate granules.

Roofing slate, mill stock,[1] and slate granules (including slate "flour") sold by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Roofing—squares	494,530	$5,084,945	465,900	$5,079,087
Approximate equivalent in short tons	166,000		157,450	
Electrical—square feet	1,655,810	1,376,948	1,857,940	1,537,034
Approximate equivalent in short tons	11,900		13,350	
Structural and sanitary—square feet	2,332,700	862,019	2,590,340	988,521
Approximate equivalent in short tons	16,700		18,550	
Grave vaults and covers—square feet	523,850	125,582	490,060	130,882
Approximate equivalent in short tons	7,500		6,900	
Blackboards and bulletin boards—square feet	5,184,060	1,690,612	3,998,800	1,356,405
Approximate equivalent in short tons	13,900		10,700	
Billiard-table tops—square feet	341,440	140,498	367,220	145,457
Approximate equivalent in short tons	2,500		2,700	
School slates—pieces	1,944,320	35,818	1,820,820	32,886
Approximate equivalent in square feet	1,040,000		973,770	
Approximate equivalent in short tons	1,400		1,300	
Granules—short tons	497,700	3,210,904	498,050	3,009,368
Other[2]—short tons (estimated)	7,000	48,000	9,000	73,127
Total (quantities approximate, in short tons)	724,600	12,575,326	718,000	12,352,767

[1] Mill stock sold, including school slates, was as follows: 1925, 11,077,860 square feet, valued at $4,231,477; 1926, 10,278,130 square feet, valued at $4,191,185.

[2] Includes slate sold for flagging (280,970 square feet, valued at $39,439, in 1925, and 379,830 square feet, valued at $63,441, in 1926), tombstones, waste slate, and other uses not specified.

Slate sold by producers in the United States, 1925–26, by States and uses

State	Operators	Roofing		Mill stock		Other uses (value)[1]	Total value
		Squares (100 square feet)	Value	Square feet	Value		
1925							
Georgia	1					(2)	(2)
Maine	3	(2)	(2)	(2)	(2)	(2)	$604,062
Maryland	3	(2)	(2)	(2)	(2)	(2)	210,148
New York	17	7,650	$134,790			$716,925	851,715
Pennsylvania	47	287,120	2,316,856	9,685,170	$3,074,438	493,885	5,885,179
Tennessee	1					(2)	(2)
Utah	1					(2)	(2)
Vermont	40	154,400	2,115,942	850,070	641,398	1,205,685	3,963,025
Virginia	5	33,800	377,082			(2)	(2)
Undistributed[3]		11,569	140,275	542,620	515,641	842,409	1,061,197
	118	494,530	5,084,945	11,077,860	4,231,477	3,258,904	12,575,326
1926							
Arkansas	1					(2)	(2)
California	3					2,976	2,976
Georgia	1	(2)	(2)	(2)	(2)	(2)	(2)
Maine	3	(2)	(2)	(2)	(2)	(2)	662,184
Maryland	3	(2)	(2)	(2)	(2)	(2)	207,989
New York	17	11,093	177,455			736,359	913,814
Pennsylvania	43	263,668	2,127,782	8,645,980	2,842,182	443,213	5,413,177
Tennessee	1					(2)	(2)
Vermont	46	148,926	2,310,410	1,011,370	768,178	1,188,453	4,267,041
Virginia	4	31,172	331,651			(2)	(2)
Undistributed[3]		11,041	131,789	620,780	580,825	711,494	885,586
	122	465,900	5,079,087	10,278,130	4,191,185	3,082,495	12,352,767

[1] For details see table of general sales on p. 100, and table on p. 104 for Pennsylvania.
[2] Included under "Undistributed."
[3] Includes output of States entered as "(2)" above.

IMPORTS AND EXPORTS [1]

Value of slate imported for consumption in the United States, 1917–1926

1917	$1,024	1922	$2,753
1918	321	1923	16,881
1919	691	1924	32,095
1920	4,512	1925	64,570
1921	2,923	1926	86,681

Slate imported into the United States 1924–1926, by countries

[General imports]

Country	1924		1925		1926 (value)[a]
	Pounds	Value	Pounds	Value	
Belgium			174	$15	$297
Canada	930	$1,853	500	1,359	21
China			190	96	68
Czechoslovakia			554	9	16
Denmark			39,683	732	
France			63,935	2,044	29,465
Germany	97,466	3,849	5,008	386	9,201
Hong Kong	48	17	211	56	10
Italy	1,045,003	15,171	1,677,945	35,601	43,797
Japan	70	50	46	25	113
Netherlands			10	12	3
Norway			25,575	1,833	506
Portugal	229,522	2,367	735,471	12,652	6,100
Spain					857
Sweden	6,393	127	21,450	1,515	
United Kingdom	215,735	8,794	239,226	8,206	3,143
	1,595,167	32,228	2,809,978	64,541	93,597

[1] The figures on imports and exports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce, except as otherwise indicated.

[a] Quantity not recorded for 1926.

Roofing slate exported from the United States, 1917–1926

Year	Number of squares	Value	Year	Number of squares	Value
1917	(1)	$27,113	1922	1,040	$97,811
1918	(1)	65,224	1923	8,462	78,780
1919	(1)	55,164	1924	8,165	77,422
1920	(1)	122,105	1925	5,785	54,130
1921	(1)	101,630	1926	5,621	53,117

[1] Quantity not recorded.

Roofing slate exported from the United States, 1924–1926, by countries

Country	1924		1925		1926	
	Number of squares	Value	Number of squares	Value	Number of squares	Value
Africa (British):						
South			110	$593		
West			8	40		
Argentina					416	$4,016
Australia	167	$1,567				
Bermuda			122	1,570	45	286
Canada	7,207	69,411	3,495	38,328	3,791	40,204
Chile			140	816		
Guatemala	3	55				
Guiana, British	6	36				
Mexico	24	116	72	380	522	1,548
Newfoundland and Labrador					70	840
New Zealand	477	4,587	89	1,069	446	3,664
Panama			147	1,635	111	832
Siam			25	128		
West Indies:						
British—						
Trinidad and Tobago	240	1,439	1,390	8,539	110	1,100
Other	16	79	32	376	110	627
Cuba	25	132	155	656		
	8,165	77,422	5,785	54,130	5,621	53,117

The following figures for exports of slate other than roofing were collected by the Bureau of Mines from shippers of the products named. Of the slate reported in this table, all the blackboard and structural material was shipped to Canada, as was over half of the electrical slate, about one-third of the slate used for billiard tables, and virtually all of the granules. School slates were shipped to Canada and to other countries; Asia was the largest consumer in 1926, South America and Central America furnished good markets for electrical slate, and Mexico, West Indies, and South America for billiard-table slate. Small shipments of granules to Germany were reported.

Slate other than roofing exported from the United States, 1924–1926, by uses

Use	1924		1925		1926	
	Quantity	Value	Quantity	Value	Quantity	Value
School slates—cases [1]	10,540	$113,865	11,050	$111,271	11,210	$92,165
Electrical slate—square feet	[2] 47,870	[2] 44,874	[2] 36,540	[2] 32,333	51,490	56,042
Blackboards—do	128,180	38,998	149,470	68,086	125,730	47,520
Billiard tables—do	4,340	1,757	32,189	16,167	46,730	37,903
Structural—do	(2)	(2)	(2)	(2)	39,870	20,800
Slate granules—short tons	8,780	54,400	15,550	100,300	7,620	46,000
		253,894		328,157		300,430

[1] Cases weigh from 130 to 165 pounds each; average is 135 pounds.
[2] Small quantity of structural slate included with electrical.

REVIEW BY DISTRICTS

The active slate-producing districts of the United States are the Monson district of Maine; the New York-Vermont district, including Washington County, N. Y., and Rutland County, Vt.; the Lehigh district, including Lehigh and Northampton Counties, Pa.; the Peach Bottom district, including Lancaster and York Counties, Pa., and Harford County, Md.; Berks County, Pa.; and the Buckingham County (Arvonia) and Albemarle County districts of Virginia. These districts produce roofing slate and mill stock; some of them produce also roofing granules and slate flour. Roofing granules and flour were produced in California, Georgia, and Tennessee also in 1926.

The report on slate in 1925 listed the operators in the different districts, and as the main changes in 1926 were among the smaller producers the list is not repeated here.

The slate produced in the Maine district is sold chiefly for electrical work, and larger sales than in 1925 were reported for 1926. Smaller amounts of slate from this district are sold for roofing and for structural work.

New York and Vermont produce all of the colored slates used for roofing. Red slate is the chief product of the New York quarries, but they also produce, with those of Vermont, the various green, purple, variegated, mottled, and "freak" slates at present in demand for roofs. The output of the New York quarries is chiefly for roofing slate and granules.

The Vermont quarries produce roofing slate, mill stock, and slate granules. The colors are in wide variety and combinations of green and purple and generally are classed as green, unfading green, unfading mottled green and purple, weathering green (sea-green), purple, variegated, and "freak." There are also black and gray varieties. Most of the granules manufactured are green.

Vermont ranks first in the production of slate for electrical use and second in the production of structural and sanitary slate. Sales of both these products increased in 1926 as compared with 1925. Some of the mill stock is also sold for vaults and covers and for billiard-table tops.

Much of the roofing slate produced in both Vermont and New York is quarried and shaped by owners of small quarries that are worked at irregular intervals. This slate is generally of unusual color and specially sized and is sold through operators of large quarries or through dealers. On account of the variety of colored slates found in the district much of the roofing slate commands a high price. The demand for slate was good in 1926, and a strike of slate makers, chiefly in the quarries near Pawlet, West Pawlet, and Wells, Vt., which somewhat curtailed the output of roofing slate in 1925, was settled in April, 1926. The roofing slate reported sold from the New York quarries increased in 1926 and that from the Vermont quarries decreased.

Production in the Peach Bottom district in Maryland and Pennsylvania was confined to roofing slate and granules in Harford County, Md.; granules in York County, Pa.; and roofing slate and granules in Lancaster County, Pa. Pennsylvania is the largest producer of slate, exclusive of slate granules, in the United States, and also produces a greater variety of slate products than any other State,

although Maine and Vermont both outrank it in output of electrical slate.

The Lehigh district, which includes Lehigh and Northampton Counties, produces nearly all of the roofing slate and all of the mill stock sold in the State. In 1926 there was an increase of 5 per cent in the mill stock sold in Pennsylvania for structural and sanitary purposes. This includes slate sold for vaults and covers. The quantity of slate sold for electrical use was about the same as in 1925, but the total value declined 5½ per cent. Slate sold for tops of billiard tables increased 25 per cent in quantity. Slate sold for blackboards and bulletin boards and for school slates decreased. Sales of roofing slate declined 8 per cent in both quantity and value. Roofing granules and flour produced in Berks, Lancaster, Northampton, and York Counties showed a decrease of 7 per cent in quantity sold. The material crushed in Berks County is a slaty shale rather than a slate and is used chiefly as a filler. In Lancaster County, the crushing plant of Gorsuch Bros., at Peach Bottom, which for several years has been the only producer of slate in the county, was abandoned, as the property was taken over by a hydroelectric power company. There were few changes in the operations of other quarries.

The sales of slate by producers in Pennsylvania, by counties and uses, in 1926 were as follows:

Slate sold by producers in Pennsylvania in 1926, by counties and uses

County	Operators	Roofing slate		Mill stock			
		Squares (100 square feet)	Value	Structural and sanitary[1]		Electrical	
				Square feet	Value	Square feet	Value
Berks, Lancaster,[2] Northampton,[2] and York	5						
Lancaster and Lehigh	10	15,930	$127,817	73,280	$22,172	342,629	$196,288
Northampton	28	247,738	1,999,965	2,774,720	974,936	145,496	131,159
	43	263,668	2,127,782	2,848,000	997,108	488,125	327,447
Total, 1925	48	287,120	2,316,856	2,702,760	896,087	488,080	346,513

County	Mill stock—Continued				Other[3]	Total value
	Blackboards and bulletin boards		School slates			
	Square feet	Value	Square feet	Value		
Berks, Lancaster,[2] Northampton,[2] and York					$441,647	$441,647
Lancaster and Lehigh	768,891	$154,079	960,927	$32,521	5	532,882
Northampton	3,229,762	1,202,221	12,840	365	[4]130,002	[4]4,438,648
	3,998,653	1,356,300	973,767	32,886	571,654	5,413,177
Total, 1925	5,083,330	1,689,336	1,040,000	35,818	600,569	5,885,179

[1] Includes slate for grave covers and vaults.
[2] For roofing granules and "flour."
[3] In 1925 includes 271,000 square feet of billiard-table material, valued at $106,684, and 69,980 short tons of granules and "flour," valued at $491,780, and in 1926, 337,430 square feet of billiard-table material, valued at $128,441, and 64,770 short tons of granules and "flour," valued at $441,647.
[4] Exclusive of value of roofing granules and "flour," which is included in first entry above.

In Virginia in 1926 the quarries in Albemarle County produced granules and those in Buckingham County produced roofing slate. A new quarry to be operated by the Monticello Slate Corporation was reported opened near Charlottesville, Albemarle County.

In Georgia and Tennessee the operations were the same as in 1925; all the product was granules and flour.

In Arkansas development work on a deposit of slate near Norman, Montgomery County, was carried on by E. C. Bird, Little Rock, but slate slabs for walks was the only product marketed. Considerable interest was shown in development of slate deposits in California in 1926, but the only report of sales was for granules and scrap slate at Placerville, Eldorado County, and Hornitos, Mariposa County.

SHIPMENTS

In 1926 another attempt was made to collect statistics regarding shipments of slate from the quarry districts to the different States. The localization of slate deposits in the most thickly populated part of the United States makes transportation to markets in other areas where cities and towns are growing up a matter of considerable importance to the slate trade. Transportation and freight rates have long been a retarding factor in the slate industry. The total quantity of slate quarried annually is small compared with that of many other mineral products, and no one company has a large output. To facilitate marketing, the large quarry companies and joint selling agencies act as distributers for many of the quarries and also as buyers for the slate trade. As a result, many quarry operators have no record of the ultimate destination of their slate. Others refuse to take the trouble to compile the statements which necessarily take time but would seem to be of material value in finding new markets for their slate, and in keeping track of fluctuations in their regular markets. Still others object to give the figures for fear of revealing their market.

As the statistics collected by the Bureau of Mines are obtained primarily from the quarrymen rather than from the dealers and jobbers, the figures showing the distribution of the sales of slate have not been satisfactory. The following, who are among the largest dealers, have, however, cooperated with the Bureau of Mines by furnishing statements of the distribution of their sales for 1926: Vendor Slate Co., Easton, Pa., selling the roofing slate of many quarrymen in Pennsylvania, Vermont, and New York; the Knickerbocker Slate Corporation, New York City, distributer of roofing slate from New York, Vermont, and Pennsylvania quarries; the Natural Slate Blackboard Co., Pen Argyl, Pa., distributer of slate blackboards; the American Slate Works and the National School Slate Co., Slatington, Pa., distributers of school slates; and the Structural Slate Co., Pen Argyl, Pa., distributer of structural and sanitary slate, electrical slate, and slate for billiard-table tops. In New York and Vermont the larger producing companies as well as jobbers and dealers act as distributing agents.

With the assistance of the dealers named, the following table of shipments has been prepared, which, although incomplete, serves to show the general trend of shipments of slate products by destination territories.

Distribution of slate products in 1926, by destinations

Destination	Roofing (squares)	Structural and sanitary (square feet)	Electrical (square feet)	Vaults and covers (square feet)	Blackboards and bulletin boards (square feet)	Billiard-table tops (square feet)	Floors and walks (square feet)	Granules and "flour" (short tons)
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	36,000	299,000	279,000	92,000	241,000	1,400	12,000	33,500
Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, West Virginia	198,000	880,000	810,000	282,000	900,000	118,000	194,500	147,500
Illinois, Indiana, Michigan, Ohio	50,000	194,000	281,000	43,000	608,000	200,000	36,000	212,000
Florida, Georgia, North Carolina, South Carolina, Virginia	12,000	40,000	1,000	32,000	174,000	2,000	13,000	27,200
Alabama, Kentucky, Louisiana, Mississippi, Tennessee	20,000	16,000	13,000	200	86,000	---	500	14,400
Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, Texas, Wisconsin	16,000	72,000	63,000	10,000	429,000	36,000	---	12,000
Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming	3,000	20,000	7,000	---	253,000	60	---	6,200
Total distribution reported	335,000	1,521,000	1,454,000	459,200	2,691,000	357,460	256,000	452,800
Total sales	465,900	2,590,340	1,857,940	490,060	3,998,800	367,220	379,830	498,050

The table gives the distribution of 72 per cent of the roofing slate and represents the first attempt to show shipments of this product. More than 59 per cent of the shipments of roofing slate were to the Middle Atlantic States, although reshipments for which no figures are available would doubtless indicate a somewhat smaller market in that territory. Distribution of 59 per cent of the structural slate was reported. The greater part of this was reported by dealers, and stock held by them, although representing the output of quarries, is not accounted for in the figures. Fifty-eight per cent of the structural slate shipped was marketed in the Middle Atlantic States.

The distribution of 78 per cent of the electrical slate was reported, and 56 per cent of this was marketed in the Middle Atlantic States. A considerable amount in the form of electrical panels and switchboards was shipped outside of the United States.

Slate for vaults and covers is marketed chiefly in the Middle Atlantic and New England States; smaller quantities go to other districts. Slate for blackboards and bulletin boards showed wider distribution than other mill-stock products. Slate for billiard-table tops goes to the centers manufacturing these tables, mostly in the districts covered by Illinois, Indiana, Michigan, and Ohio, and the Middle Atlantic States. Slate sold for floors and walks is used mostly in markets near the quarry centers.

School slates are mostly exported and are shipped all over the world, markets being reported in Canada, Asia, Europe, Africa, West Indies, South America, Mexico, and various oceanic islands. Slate granules used for surfacing manufactured roofing material are shipped to the large manufacturing districts, covered to a great extent by Illinois, Indiana, Michigan, and Ohio, and the Middle Atlantic States. Some are shipped to Canada, and in 1926 a quantity was shipped to Germany.

FELDSPAR

By Jefferson Middleton

GENERAL CONDITIONS

During 1926 the feldspar industry made further advances in quantity and value of product and in technique or ability to meet the exacting demands of the consumers. The quantity and value of both crude and ground feldspar sold or used by the producers were the largest ever recorded. The sales of crude feldspar increased 13 per cent, compared with 1925, and nearly 3 per cent compared with 1924, the year of largest output and value prior to 1926. The value of this feldspar increased 22 per cent compared with 1925 and 6 per cent compared with 1924. In 1926 the total quantity of ground feldspar sold exceeded by 6 per cent and its value exceeded by 5 per cent the quantity and value, respectively, of 1925. The increases were in the product from domestic feldspar. The quantity and value of ground material derived from Canadian feldspar were less in 1926 than in 1925. The purchase of the Clinchfield Products Corporation by the Erwin Feldspar Co. (Inc.) and the erection of a modern feldspar-grinding plant at Spruce Pine, N. C., in the heart of the feldspar-producing region, by the Tennessee Mineral Products Co., were notable events in the industry during the year. The tendency seems to be more and more toward the production of feldspar by large organizations from large deposits and away from the production by small producers who sell or barter their feldspar to some central agent or to the grinders. This change enables the grinder to produce a more uniform product—one of the most important requirements for use in the ceramic industries.

Imports of crude feldspar increased in even larger proportion than did production. In 1926 they constituted one-eighth of the total new supply of crude feldspar.

There is no record of exports of feldspar, and if any feldspar is exported the quantity is, no doubt, negligible.

PRODUCTION

Statistics of production of feldspar are presented separately for crude feldspar, or mine and quarry output, and for ground feldspar, or mill output. The crude feldspar is reported in long tons of 2,240 pounds and the ground feldspar in short tons of 2,000 pounds, ac-

cording to the common practice in the industry. The average value of crude feldspar in 1926 at the mine or shipping point nearest thereto was $7.65 a long ton, or 57 cents higher than that of 1925, and was the highest ever recorded. In 1926 the average value of ground domestic feldspar was 4 cents a short ton lower than that of 1925, and that of Canadian spar ground in the United States was 64 cents lower than that of 1925. The average values of crude spar as reported by individual producers ranged from $3 to $12 a long ton. For New England the range was from $6.69 to $12; for Maryland, New York, Pennsylvania, and Virginia from $3 to $10.47; for North Carolina from $3 to $7.50; and for Arizona, California, Colorado, and South Dakota from $3 to $8.79.

CRUDE FELDSPAR

In 1926 crude feldspar was reported from 12 States, the same as in 1925. New Hampshire was the only important producing State that showed a decrease in output. Maryland was the only State to show decline in quantity and value.

Crude feldspar sold or used by producers in the United States, 1917–1926

Year	Long tons	Value		Year	Long tons	Value	
		Total	Average			Total	Average
1917	126,715	$474,767	$3.75	1922	117,127	$844,568	$7.21
1918	88,498	429,989	4.86	1923	145,004	1,057,595	7.29
1919	63,441	347,992	5.49	1924	204,772	1,509,339	7.37
1920	135,551	851,123	6.28	1925	185,706	1,315,654	7.08
1921	91,865	617,652	6.72	1926	209,989	1,607,101	7.65

Crude feldspar sold or used by producers in the United States, 1921–1926, by States

[Value is at mine or nearest shipping point]

State	1921		1922		1923	
	Long tons	Value	Long tons	Value	Long tons	Value
Arizona					(1)	(1)
California	[2] 2,057	[2] $15,847	2,378	$17,510	9,297	$62,499
Colorado	(2)	(2)	104	580	(1)	(1)
Connecticut	9,565	65,864	7,499	47,887	8,780	75,379
Maine	18,866	134,168	21,692	221,478	25,029	230,122
Maryland	5,155	33,798	2,899	18,099	2,750	17,010
New Hampshire	(1)	(1)	14,017	116,751	23,220	171,789
New York	(1)	(1)	(1)	(1)	15,161	127,477
North Carolina	40,712	259,603	56,043	333,745	57,622	360,636
Pennsylvania	(1)	(1)	(1)	(1)	2,069	6,355
Virginia			(1)	(1)	(1)	(1)
Undistributed	15,510	108,372	12,495	88,518	1,076	6,328
	91,865	617,652	117,127	844,568	145,004	1,057,595

[1] Included under "Undistributed."
[2] California includes a small amount from Colorado.

Crude feldspar sold or used by producers in the United States, 1921–1926, by States—Continued

State	1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value
Arizona	[1]	[1]	[1]	[1]	[1]	[1]
California	8,027	$62,344	6,077	$49,881	6,271	$49,300
Colorado	[1]	[1]	[1]	[1]	[1]	[1]
Connecticut	6,572	51,422	10,426	71,201	11,436	87,844
Maine	29,912	271,354	28,404	256,731	33,397	306,695
Maryland	4,854	25,020	4,554	26,438	[1]	[1]
New Hampshire	39,425	324,638	38,366	278,736	33,271	287,596
New York	13,839	108,751	10,474	70,446	15,517	157,865
North Carolina	97,075	640,403	76,806	496,563	91,433	602,020
Pennsylvania	1,481	4,763	1,330	4,722	1,484	4,492
South Dakota	[1]	[1]	[1]	[1]	[1]	[1]
Virginia	[1]	[1]	[1]	[1]	[1]	[1]
Undistributed	3,587	20,644	9,269	60,936	16,680	111,289
	204,772	1,509,339	185,706	1,315,654	209,989	1,607,101

[1] Included under "Undistributed."

GROUND FELDSPAR

Probably all the feldspar consumed industrially, except that used for facing cement work, for covering prepared roofing, for "chicken grits," and like purposes, is prepared by fine grinding. Even for such uses the spar is at least crushed to small sizes and more or less graded by screening, but it has not been possible to canvass all users of feldspar to determine the amounts ground and used by them. All known merchant mills or grinders—that is, those who quarry or purchase crude spar and grind it for sale to other establishments—have been canvassed for statistics of ground feldspar during the last five years.

In 1926, 29 operators running 31 mills in 13 States reported 225,362 short tons of ground feldspar, a decrease of 4 operators compared with 1925. Of these operators 23 worked exclusively on domestic feldspar, 4 on Canadian feldspar, and 2 ground both domestic and Canadian feldspar. Of the total quantity 88 per cent (199,215 tons) was from domestic feldspar and 12 per cent (26,147 tons) was from Canadian feldspar, a slight gain in favor of the domestic spar.

In 1926 the average value per ton of ground feldspar from domestic crude was $16.29, a decrease of 4 cents a ton compared with 1925; and from Canadian crude it was $20.26, a decrease of 64 cents compared with 1925. Direct comparisons of values are misleading, however, as the figures for Canadian spar generally relate to high-grade material at mills near points of consumption, whereas the figures for domestic spar cover all grades at various points, many of which are distant from consuming centers. Tennessee is the leading producer of ground feldspar from domestic crude, reporting nearly one-third of the total for 1926; Maine was second, displacing New Jersey, with 16 per cent of the total; and New Jersey was third with 14 per cent. New York reported 90 per cent of the feldspar ground in this country from Canadian crude. The average value per ton of ground feldspar from domestic crude ranged from $12.04 to $22.43.

Ground feldspar sold by merchant mills[1] in the United States, 1922–1926

Year	Number of operators	Domestic			Canadian			Total		
		Short tons	Value		Short tons	Value		Short tons	Value	
			Total	Average		Total	Average		Total	Average
1922	20	107,969	$1,790,305	$16.58	19,075	$364,082	$19.09	127,044	$2,154,387	$16.96
1923	26	151,855	2,486,810	16.38	25,374	486,546	19.17	177,229	2,973,356	16.78
1924	30	163,905	2,760,286	16.84	25,875	522,884	20.21	189,780	3,283,170	17.30
1925	33	184,816	3,017,845	16.33	28,042	586,000	20.90	212,858	3,603,845	16.93
1926	29	199,215	3,246,174	16.29	26,147	529,623	20.26	225,362	3,775,797	16.75

[1] Does not include potters and others who grind for consumption in their own plants.

Ground feldspar sold by merchant mills[1] in the United States, 1925–26, by States

State	1925					1926				
	Number of operators	Domestic		Canadian		Number of operators	Domestic		Canadian	
		Short tons	Value	Short tons	Value		Short tons	Value	Short tons	Value
California	4	6,524	$133,284	-------	-------	4	10,899	$218,589	-------	-------
Maine	4	26,514	497,348	-------	-------	4	32,076	587,406	-------	-------
New Jersey	3	39,028	757,339	-------	-------	3	28,430	550,195	(2)	(2)
New York	5	8,386	96,129	[3] 24,756	[3] $529,796	4	(2)	(2)	23,533	$473,686
Ohio	4	(2)	(2)	3,286	56,204	3	(2)	(2)	(2)	(2)
North Carolina	1	66,637	868,741	-------	-------	1	76,891	978,477	-------	-------
Tennessee	4					3				
Undistributed [4]	8	37,727	665,004	-------	-------	7	50,919	911,507	2,614	55,937
	33	184,816	3,017,845	28,042	586,000	29	199,215	3,246,174	26,147	529,623

[1] Does not include potters or others who grind for consumption in their own plants.
[2] Included under "Undistributed."
[3] Includes a small amount from Pennsylvania.
[4] 1925: Colorado, Connecticut, Illinois, Maryland, New Hampshire, Ohio (domestic), and Pennsylvania; 1926: Colorado, Connecticut, Illinois, Maryland, New Hampshire, New Jersey (Canadian), New York (domestic), Ohio, and Pennsylvania.

USES

The uses of feldspar are manifold. Its principal use is as a flux in the pottery (both body and glaze), glass, and enameling industries, including tiles, porcelains, and so-called marbles that find their use in hotels, restaurants, drug stores, and other places where a vitrified surface is desired for sanitary reasons. It is also used as an abrasive in scouring soap, as a binder in the manufacture of abrasive wheels, as poultry grit, as a constituent of roofing material, and in stucco or pebble dash. Small quantities of the purest grades of potash feldspar are used in the manufacture of artificial teeth. Efforts to use feldspar as a source of supply of potash on a commercial scale continue, but claims of success remain unestablished.

THE INDUSTRY BY STATES

In 1926 the production of crude feldspar was reported from 12 States, which were, in the order of their output, North Carolina, Maine, New Hampshire, New York, Connecticut, California, Vir-

ginia, Arizona, South Dakota, Maryland, Pennsylvania, and Colorado. North Carolina, New York, Connecticut, California, Pennsylvania, and Colorado maintained their relative ranks of first, fourth, fifth, sixth, eleventh, and twelfth, respectively, in 1925 and 1926. New Hampshire was second in 1925 and third in 1926; Maine was third in 1925 and second in 1926; Maryland was seventh in 1925 and tenth in 1926; South Dakota was eighth in 1925 and ninth in 1926; Virginia rose from ninth in 1925 to seventh in 1926; and Arizona rose from tenth in 1925 to eighth in 1926. Feldspar was ground in each of the producing States except Arizona, South Dakota, and Virginia. In addition mills grinding feldspar were operated in Illinois, New Jersey, Ohio, and Tennessee. In California, New Jersey, New York, and Ohio the mills are at or near the centers of consumption; in most of the other States they are near the points of production.

Arizona.—The deposit of feldspar near Kingman, Mohave County, was operated during 1926 by the Kingman Feldspar Co. In 1927 this property is being operated by the Gold Cliff Central Mining Co. The material is used by ceramic industries in California.

California.—Four operators in Imperial, Riverside, and San Diego Counties reported production of crude feldspar in 1926. The quantity increased and the value decreased compared with 1925. The changes, however, were small. The quantity and value of ground feldspar increased by more than 64 per cent compared with 1925. California ranked sixth and seventh in the production of crude and ground spar, respectively, in 1926. A considerable part of the crude spar consumed in California comes from Arizona.

Colorado.—In 1926 the production of crude feldspar in Colorado increased and its value decreased. In 1926 two producers reported sales. A third deposit (in Fremont County) was in the development stage. The production and value of ground spar decreased, compared with 1925. Colorado ranked twelfth in the production and value of crude spar and thirteenth in the production and value of ground spar.

Connecticut.—Connecticut ranked fifth in the production and value of crude feldspar in 1926, 10 operators reporting sales. The quantity of crude spar sold or used by the producer increased 10 per cent, and its value 23 per cent, compared with 1925. The product of the quarries of L. W. Howe and the Tidewater Feldspar Co. was ground in mills operated by these producers. The output of the other quarries was shipped to mills at Trenton, N. J., and East Liverpool, Ohio, where it was ground for ceramic use.

Illinois.—The mill at Murphysboro operated by the Isco-Bautz Co. (Inc.) continued running on feldspar from South Dakota.

Maine.—In 1926 Maine ranked second among the States in the production of both crude and ground feldspar, displacing New Hampshire by a small margin in the former and New Jersey in the latter. The production of crude spar in Maine showed an increase of 19 per cent in quantity and value, compared with 1925. In 1926 Maine produced 16 per cent of the total output of crude spar. Androscoggin, Oxford, and Sagadahoc were the producing counties. The sales of ground spar in Maine increased 21 per cent in quantity and 18 per cent in value.

Maryland.—In 1926 the output of crude feldspar in Maryland declined in quantity and value, compared with 1925, and the State dropped from seventh to tenth in rank in production and value of crude feldspar. The one grinder in the State, the Seaboard Feldspar Co., of Baltimore, obtains its supply of crude spar from the quarries of the State and from North Carolina and Virginia.

New Hampshire.—In 1926 New Hampshire ranked third in the production and value of crude feldspar and reported slightly less than 16 per cent of the total output. The production of this State decreased 13 per cent and the value of its output increased 3 per cent, compared with 1925. The Eureka Flint & Spar Co., the Golding-Keene Co., and the Standard Feldspar Co. are the large producers. New Hampshire's product was used in the soap and ceramic industries. The Golding-Keene Co. operated the only grinding mill in the State.

New Jersey.—New Jersey produces no crude feldspar, and its connection with the feldspar industry is through its grinding mills. At Trenton are the mills of the Eureka Flint & Spar Co., the Golding Sons Co., and the Trenton Flint & Spar Co. In 1926 these mills reported 14 per cent of the domestic ground spar. Trenton is one of the chief feldspar markets and one of the principal centers of feldspar consumption by reason of its large pottery industry and the capacity of its mills.

New York.—In 1926 New York ranked fourth in the production and value of crude spar and fifth in the production and fourth in the value of ground feldspar from domestic rock; it is the largest grinder of Canadian feldspar and ranks second in the total production of ground feldspar. Its output of crude spar in 1926 came from Saratoga, St. Lawrence, and Westchester Counties and was mined by the Adirondack Feldspar Corporation, the Green Hill Mining Co., and the Bedford Mining Co. (Inc.), respectively. There were four active grinding mills in the State. The mill of the Bedford Mining Co. (Inc.) ground only domestic feldspar; those of the Genesee Feldspar Co. (Inc.) and the Dominion Feldspar Corporation ground Canadian spar only; and that of the New York Feldspar Corporation ground both domestic and Canadian feldspar.

North Carolina.—In 1926 North Carolina was the largest producer of crude feldspar, as it has been for a number of years, its output being nearly three times as large as that of Maine, the second State. Sales of crude feldspar in 1926 in this State showed an increase of 14,627 tons, or 19 per cent, and of $105,457, or 21 per cent, compared with 1925. The production and value in 1926 were the highest recorded except those of 1924. The quantity sold in 1926 was more than twice as large as that of 1917, and its value was more than four times that of 1917. The average value per ton in 1926 was $6.58, compared with $6.47 in 1925 and $3.10 in 1917. North Carolina's output constituted nearly 44 per cent of the total quantity and 37 per cent of the total value in 1926. A considerable part of this output was made by numerous small operators who sell or barter the feldspar to some central distributing agency. Some of the larger buyers and distributors are the Erwin Feldspar Co. (Inc.), the Carolina Mineral Co., and J. C. Pitman. In 1926 most of the spar (81 per cent) was produced in Mitchell County; Avery and Yan-

cey Counties also produced feldspar. In 1926 only one feldspar-grinding mill was active, that of the North State Feldspar Corporation.

Ohio.—No feldspar is produced in Ohio, but this State and adjacent territory in Pennsylvania and West Virginia produce more than one-half of the high-grade pottery made in the United States; hence the region is a large consumer of feldspar. The potteries are partly supplied by mills within the State which are operated by the Golding Sons Co. and the Potters Mining & Milling Co., East Liverpool, and the Rock Products Co., at Silica, near Toledo. The Golding Sons Co. ground only domestic spar in 1926; the Potters Mining & Milling Co. and the Rock Products Co. ground only Canadian feldspar.

Pennsylvania.—In 1926 the production of crude feldspar in Pennsylvania was 1,484 tons, valued at $4,492, an increase of nearly 12 per cent in production, but a decrease of 5 per cent in value, compared with 1925. The average value per ton in this State was $3.03, the lowest State average in the country. The only mill in the State was operated by the American Feldspar Co. at Toughkenamon.

South Dakota.—The output of crude feldspar in South Dakota in 1926 was reported by the Keystone Feldspar & Chemical Co., which has a quarry at Keystone, Pennington County. The Dakota Feldspar Co., with a quarry at Pringle, Custer County, and the Herbert Tin Co., Custer, reported development work during 1926 with probable shipments in 1927.

Tennessee.—Tennessee is another State that is important in the domestic feldspar industry, but has no feldspar quarries. Its northeastern border is near the North Carolina feldspar region, and the Clinchfield Railroad, which traverses northeastern Tennessee and southwestern North Carolina, offers the natural outlet for that region. Consequently, although local grinding of feldspar did not begin until 1914, the State now contains the largest feldspar-grinding center in the country, there being three mills at Erwin, two of them operated by the Erwin Feldspar Co. (Inc.) and one by the Golding Sons Co., and one mill at Bristol operated by the Tennessee Mineral Products Co. As most of the North Carolina feldspar is ground in Tennessee mills, it seems appropriate to group these States to represent the output of the region. In 1926 the sales of ground feldspar from these mills were 76,891 short tons, valued at $978,477, or 39 per cent of the total quantity and 30 per cent of the total value of domestic ground spar. In 1926 the Clinchfield Products Corporation, one of the large operators in the region, with quarries in North Carolina and a mill at Erwin, was purchased by the Erwin Feldspar Co. (Inc.).

Vermont.—No feldspar was sold in Vermont in 1926, but a deposit at Chester was under development during the year and a small quantity was mined. According to reports, a grinding mill will be erected to handle the output.

Virginia.—The Clinchfield Sand & Feldspar Corporation, of Baltimore, Md., owns or controls two quarries at Moneta, Bedford County, Va., which were active during 1926. The product is described as a high-grade potash spar, which was used in the manufacture of soap, high-tension insulators, and enameled ware.

IMPORTS [1]

The foreign trade of the United States in feldspar is small and is limited largely to imports from Canada. Before the tariff act of 1922 (September 22) imports of feldspar were not specifically classified in the official records of the Bureau of Foreign and Domestic Commerce, and are therefore unknown, but from that date until the end of the year, 37 long tons of crushed or ground feldspar, valued at $538, was imported. No imports of crushed or ground feldspar were recorded from 1923 to 1925, but 36 long tons, valued at $1,743, was imported in 1926. The following table shows the imports of crude feldspar since the change in tariff:

Crude feldspar imported for consumption in the United States, 1922–1926

Year	Long tons	Value	
		Total	Average
1922 (Sept. 22–Dec. 31)	7,549	$60,111	$7.96
1923	24,271	184,924	7.62
1924	35,139	284,716	8.10
1925	24,994	203,524	8.14
1926	29,941	251,896	8.41

FOREIGN PRODUCTION

A considerable part of the supply of feldspar annually available for use in the United States is mined in Canada. According to reports of the Dominion Bureau of Statistics the Canadian shipments—all from Ontario and Quebec—amounted in 1926 to 32,099 long tons, valued at $310,238, or $9.67 a ton, an increase of 25 per cent in quantity and 32 per cent in value compared with 1925. The sales of Canadian spar ground in the United States in 1926 constituted 12 per cent of the total sales of ground feldspar in this country in that year, a proportion about the same as that for several years.

Feldspar, produced in Canada, sold in 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	17,377	$89,826	1922	24,756	$248,402
1918	16,770	112,728	1923	26,094	237,601
1919	13,106	86,231	1924	40,004	358,540
1920	33,815	280,895	1925	25,608	235,789
1921	26,668	230,754	1926	32,099	310,238

The following table shows the most recent figures of production of feldspar in the chief producing countries. Besides the United States and Canada, Germany, Japan, Norway, and Sweden are the important producers. Although Great Britain has an immense pottery industry, it appears to be a small producer of feldspar. Cornwall stone rather than feldspar is extensively used as a flux in the British pottery industry.

[1] Figures on imports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Feldspar produced in principal producing countries, 1922–1926, in metric tons[1]

Country	1922	1923	1924	1925	1926
Australia:					
New South Wales	25	13	15	33	11
South Australia		20		10	105
Western Australia (exports)	61				8
Canada	25,153	26,512	40,645	26,019	32,614
Finland	1,322	[2] 689	[2] 681	[2] 753	[2] 738
France	2,000	4,980	5,800	3,200	[3]
Germany (Bavaria)	6,080	8,986	33,138	10,258	6,660
Great Britain	843	3,298	1,070		[3]
Italy	2,790	5,070	5,200	3,400	5,878
Japan	16,051	22,940	23,427	19,049	[3]
Norway (exports)	11,833	13,073	20,875	26,785	20,510
Russia	685	[4] 117	[3]	[3]	[3]
Sweden	22,371	16,857	19,309	26,751	[3]
United States	119,007	147,331	208,059	188,687	213,359

[1] Compiled by L. M. Jones, of the Bureau of Mines.
[2] Exports.
[3] Data not available.
[4] Year ended Sept. 30.

POTASH

By A. T. Coons

PRODUCTION AND SALES

Production of potash in the United States during 1926 showed a decrease from 1925 of 10 per cent in crude potassium salts and of 8 per cent in the potash (K_2O) content. The average per cent of K_2O in the salts produced was 50.4 in 1926, as compared with 49.4 per cent in 1925.

Sales of crude potassium salts were 3 per cent less and the potash content of the material sold also 3 per cent less than in 1925. The total value of the potassium salts sold in 1926 was 10 per cent less than in 1925, and the value per unit (20 pounds of K_2O) was 43 cents, as compared with 47 cents in 1925. As in 1925, the sales were larger than the production.

The stocks remaining in producers' hands decreased about 16 per cent. Two less plants reported production in 1926 than in 1925, one less reported sales, and three less reported stocks remaining on hand. The tables of sales by States and by sources are omitted to avoid disclosing individual production. A summary of production, sales, and producers' stocks of potassium salts in the United States for the past 10 years is given in the following table:

Potassium salts produced, sold, and in stock in the United States, 1917–1926

Year	Production			Sales[1]				Stocks		
	Number of plants	Crude potassium salts (short tons)	Content of K_2O (short tons)	Number of plants	Crude potassium salts (short tons)	Content of K_2O (short tons)	Value f. o. b. plant	Number of plants	Crude potassium salts (short tons)	Content of K_2O (short tons)
1917	95	126,961	32,573	[2]	126,961	32,573	$13,980,577	[2]	[2]	[2]
1918	128	207,686	54,803	[2]	140,343	38,580	15,839,618	[2]	67,343	16,223
1919	102	116,634	32,474	[2]	166,063	45,728	11,271,269	[2]	[2]	[2]
1920	66	166,834	48,077	64	139,963	41,414	7,463,026	38	32,378	8,999
1921	20	25,485	10,171	23	10,337	4,408	447,859	30	32,925	12,625
1922	12	25,176	11,714	16	22,028	11,313	463,512	16	30,100	11,653
1923	12	39,029	20,215	11	35,164	19,281	784,671	14	34,794	12,363
1924	12	43,734	22,903	9	37,492	21,880	842,618	11	32,389	10,770
1925	9	51,565	25,448	7	52,823	25,802	1,204,024	7	[3]30,919	10,276
1926	7	46,324	23,366	6	51,369	25,060	1,083,064	4	[4]26,000	[4]9,000

[1] Production and sales were practically the same in 1917 and no distinction was made between them.
[2] Figures not available.
[3] Of this quantity 212 tons was lost by leaching, etc.
[4] Estimate.

PRODUCING LOCALITIES

In 1926 the potassium salts produced were from alunite, from natural brines, from flue dusts of blast furnaces, from the waste from molasses distillation, and from glauconite. The American Potash & Chemical Corporation (successor to the American Trona Corporation), 233 Broadway, New York, N. Y., the chief American producer of potassium salts, also recovered borax and other natural sodium salts as by-products from its plant at Trona (Searles Lake), San Bernardino County, Calif. Its output of potassium salts decreased 11 per cent in 1926, and somewhat more was marketed than produced. The product sold by this company has a higher content of potash (K_2O) than that of any other company, and the per cent in 1926 (58.33) was higher than in 1925 (56.5). Also, in California, the Oliver Chemical Co., Mount Eden, Alameda County, produced a small amount of potassium salts as by-product in the manufacture of magnesium chloride, but none was sold. The plant of the United States Industrial Chemical Co. (address, 110 East Forty-second Street, New York, N. Y.), at Baltimore, Md., was the second largest producer of potassium salts in 1926. The salts averaged 33 per cent K_2O, were mixtures of sulphates, chlorides, and small amounts of carbonates, and were recovered from the waste from molasses distillation. This is the third year of potash production for this company. Its sales in 1926 were 35 per cent more than its production, but its stock on hand January 1, 1927, was considerable. Potassium salts (chiefly sulphates), from flue dusts of blast furnaces, were produced and sold at the Lucy and Isabella furnaces of the Carnegie Steel Co. (Pittsburgh, Pa.). A small amount of alunite was shipped from Belknap, Utah, by George H. Budd, and used crude for fertilizer in an experimental test. The United States Fertilizer Co. made small shipments of roasted alunite and of complete fertilizer from Marysvale, Utah, for experimental purposes, but abandoned the project during the year. The Electro Co., Odessa, Del., made a small output of potash alum from glauconite (greensand marl) obtained in Delaware.

The results of investigations of potash deposits in Texas, New Mexico, and other potash-bearing localities, as carried on by the Bureau of Mines, the Geological Survey, and other Government bureaus, are published in separate pamphlets and are not reviewed here.

IMPORTS AND EXPORTS[1]

Imports of potash materials are shown in the following tables. The materials are classified as salts used chiefly in the fertilizer industry and as those used chiefly in the chemical industries. The former class, which includes kainite, manure salts, muriate, and sulphate, constituted 92 per cent of the total imports.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Potash materials imported for consumption in the United States, 1925–26[1]

Material	Approximate K_2O content (per cent)	1925				1926			
		Short tons	Content of K_2O		Value	Short tons	Content of K_2O		Value
			Short tons	Percentage of total			Short tons	Percentage of total	
Used chiefly in fertilizers:									
Kainite	12.4	204,767	25,391	9.8	$1,173,125	203,702	25,259	9.5	$1,225,166
Manure salts	20.0	430,340	86,068	33.3	3,676,620	354,413	70,883	26.6	3,391,100
Muriate (chloride)	50.0	180,351	90,176	34.9	5,193,866	223,049	111,525	41.9	6,195,830
Sulphate	48.6	77,226	37,532	14.6	2,686,408	78,258	38,033	14.3	2,823,058
		892,684	239,167	92.6	12,730,019	859,422	245,700	92.3	13,635,154
Used chiefly in chemical industries:									
Bicarbonate	46.0	168	77	------	21,100	263	121	------	30,747
Bitartrate (argols)	20.0	12,356	2,471	1.0	1,694,538	12,837	2,567	1.0	1,791,160
Bitartrate (cream of tartar)	25.9	158	40	------	43,525	124	31	------	30,904
Bromide	39.6	119	47	------	62,028	35	14	------	18,549
Carbonate, crude	61.0								
Carbonate, crude or black salts	50.0	3,963	2,417	1.0	349,286	5,762	3,515	1.3	533,840
Carbonate, refined	67.0								
Caustic	80.0	6,138	4,910	1.9	734,967	6,483	5,186	2.0	770,468
Chlorate and perchlorate	38.0	5,890	2,238	.9	479,222	6,268	2,382	.9	459,584
Chromate and bichromate	40.0	2	1	------	778	4	2	------	1,449
Cyanide	70.0	1,149	804	.3	216,683	52	36	------	36,350
Ferricyanide (red prussiate)	42.0	103	43	------	30,291	83	35	------	46,203
Ferrocyanide (yellow prussiate)	44.0	113	50	------	27,238	69	30	------	18,207
Iodide	28.0	(2)	(2)	------	263	(2)	(2)	------	75
Nitrate (saltpeter), crude	40.0	9,404	3,762	1.5	447,717	10,546	4,218	1.6	526,573
Nitrate (saltpeter), refined	46.0	4,631	2,130	.8	484,660	5,073	2,334	.9	460,619
Permanganate	29.0	44	13	------	8,203	118	34	------	20,852
Rochelle salt	22.0	176	39	------	38,419	135	30	------	31,255
All other	50.0	15	8	------	2,829	89	45	------	19,876
		44,429	19,050	7.4	4,641,747	47,941	20,580	7.7	4,796,711
Grand total	------	937,113	258,217	100.0	17,371,766	907,363	266,280	100.0	18,431,865

[1] The figures in this table were compiled by J. A. Dorsey from the records of the Bureau of Foreign and Domestic Commerce by recalculation from pounds to short tons and to actual potash (K_2O) and by giving the totals for calendar years instead of fiscal years. The tons are calculated to the nearest even unit, and the values are those given in the original records, so that the value given for a high-priced commodity received in small quantity may not be strictly applicable to the quantity given in tons. Furthermore, the values are those placed on the commodities by the shippers and represent the values at point of shipment and do not agree with the market quotations in this country.

[2] Quantity of iodide imported was as follows: 1925, 43 pounds; 1926, 10 pounds.

In 1913 the last normal year before the war, the United States imported 272,457 short tons of K_2O; in 1926 the imports were 266,280 tons, or 98 per cent of that amount, and 3 per cent more than the imports in 1925. The imports in 1926 were eleven times the production of the United States. The combined imports and domestic production in 1926 were 6 per cent more than the imports in 1913, when the total supply was imported.

Potash (K_2O) content of potash-bearing materials imported for consumption in the United States, 1912–1926, in short tons

1912	253,678	1917	8,100	1922	201,415
1913	272,457	1918	7,957	1923	209,950
1914	207,089	1919	39,619	1924	200,365
1915	48,867	1920	224,792	1925	258,217
1916	7,885	1921	78,698	1926	266,280

The following table indicates the amount of potash-bearing materials imported in 1926 and the countries from which last shipment was made. Germany and France supplied virtually all of the crude salts and much the larger part of the refined salts imported.

Potash materials imported into the United States in 1926, in short tons[1]

[General imports. The figures in parentheses in the column headings indicate the estimated percentage of contained K_2O]

Country	Muriate (chloride) (50)	Sulphate (48.6)	Manure salts (20)	Kainite (12.4)	Bitartrate		Caustic (80)	Carbonate (61)	Cyanide (70)	Nitrate (saltpeter), crude (40)	Chlorate and perchlorate (36)	All other (50)	Total	
					Argols or wine lees (20)	Cream of tartar (25)							Short tons	Value
Algeria and Tunisia					350								350	$42,968
Argentina					884								884	110,657
Belgium	20,804	1,136	28,623	5,263				42		21		532	56,421	1,071,914
Canada	3,242	8	289		1	(2)						(2)	3,540	112,686
Chile					101					8,698	122		8,921	434,633
China	(2)							4					4	1,072
Cuba											(2)		(2)	51
Czechoslovakia								278				78	356	34,578
France	66,289	5,562	95,836	68,824	6,762	90			1	22	(2)	925	244,311	4,425,499
Germany	130,607	71,142	225,573	128,808	7		6,184	4,803	49	1,801	6,055	3,816	578,845	11,216,251
Greece					856								856	103,058
Honduras									(2)				(2)	31
Hong Kong	(2)							1		(2)			1	137
Italy					1,177	40							1,217	200,455
Netherlands	1,287	270	4,092	807			6	634	2			294	7,392	187,778
Portugal					882								882	113,643
Spain	865				1,765								2,630	244,651
Sweden		140					240				33	6	419	55,722
Switzerland						(2)					56	(2)	56	9,818
Turkey in Asia					(2)								(2)	74
United Kingdom							55	(2)	(2)	4	2	53	114	24,176
	223,094	78,258	354,413	203,702	12,785	130	6,485	5,762	52	10,546	6,268	5,704	907,199	18,389,852
Content of potash (K_2O)	111,547	38,033	70,883	25,259	2,557	33	5,188	3,515	36	4,218	2,256	2,852	266,377	

[1] The figures in this table were compiled by J. A. Dorsey from the records of the Bureau of Foreign and Domestic Commerce by recalculation to short tons and to the actual potash (K_2O) and by giving the totals by the calendar year instead of the fiscal year. The tons are calculated to the nearest even unit. The data represent general imports and include both imports for immediate consumption and those going to warehouses, which may or may not be entered for consumption during the year. They differ slightly from the figures in the preceding table of imports, which represents imports for consumption.

[2] Less than 1 ton.

Some refined potassium salts are exported from the United States.

Potassium salts exported from the United States, 1925–26

Salt	1925		1926	
	Gross weight (short tons)	Value	Gross weight (short tons)	Value
Potassium bichromate	231	$35,795	64	$10,308
All other potassium salts	1,924	362,945	1,615	308,893
	2,155	398,740	1,679	319,201

CONSUMPTION

The consumption of potash in the United States in 1926, as indicated by the imports plus the sales of domestic products, was 958,732 short tons of material containing 291,340 short tons of K_2O, valued at $19,514,929. This was an increase of 3 per cent in quantity of K_2O and 5 per cent in value, as compared with 1925. Of these totals 5 per cent of the material containing 9 per cent of the K_2O and representing 6 per cent of the total value was produced in this country. About 93 per cent of the total supply was used in the manufacture of fertilizers.

MARKET CONDITIONS

Market conditions showed little change from those of the preceding year. As cotton, tobacco, and "truck" are the chief potash-consuming crops, the States east of Mississippi River and south of Ohio River and the Mason and Dixon line are the chief users of potash, although in the Northeastern States potash is used for growing potatoes and other vegetables. The prices at which foreign potash has been available have continued to curb American production and particularly to discourage the launching of new enterprises.

PRICES

Prices of potash in the United States are controlled by quotations on imported potash made by the Potash Importing Corporation of America and the United States Bureau of the Société Commerciale des Potasses d'Alsace, representing, respectively, the German and French potash-producing interests. There were three advances in the price of potassium salts during 1926. The first, in April, affected the two grades of kainite and the 20 and 30 per cent grades of manure salts, both in bags and in bulk. The second increase was in the price of all potassium salts and was effective from November 1 until November 30 on all orders of minimum quantities of 50 tons in bags and 200 tons in bulk. December 1 the prices of all potassium salts were advanced for an indefinite time with the same limit as to quantities. The prices of the low-grade salts (kainite and manure salts) were most affected by the changes made during the year. These salts in bags advanced from 15 to 20 per cent in price and in bulk lots from 9 to 12½ per cent. The high-grade salts

(sulphate, muriate, and potash-magnesia sulphate) advanced from 3 to 4 per cent in bags and 2 to 3 per cent in bulk lots. The reasons stated for the advance in prices were the increased cost of bags, higher freight rates, and higher costs of handling.

The prices per ton ruling at the end of 1925 and 1926 for the different grades of salts were as follows:

Prices of different grades of potassium salts at end of year, 1925–26

		1925	1926
Sulphate, 90 to 95 per cent	in bags	$45.85	$47.30
	in bulk	44.60	45.70
Muriate, 80 to 85 per cent	in bags	34.90	36.40
	in bulk	33.65	34.80
Potash-magnesia sulphate (double manure salts), 48 per cent	in bags	26.35	27.25
	in bulk	25.10	25.65
Manure salts, 30 per cent	in bags	20.00	21.75
	in bulk	18.00	18.75
Manure salts, 20 per cent	in bags	13.35	15.40
	in bulk	11.35	12.40
Kainite, 14 to 16 per cent	in bags	10.50	12.50
	in bulk	8.50	9.50
Kainite, 12.4 per cent	in bags	10.00	12.00
	in bulk	8.00	9.00

All quotations were made c. i. f. eastern United States ports, and prices were guaranteed against sellers' decline until April, 1927. Stipulations governing discounts, settlements, etc., in effect during 1926 were, according to Oil, Paint and Drug Reporter, April 26, 1926, as follows: The usual discounts, based on tons of actual potash (K_2O), ranging from 5 per cent on purchases of 50 tons to 10 per cent on purchases of 500 tons and over, and summer discounts of 4 per cent, and 2 per cent on net prices on orders for shipments delivered between May 1 and September 1 were offered during the year. Besides these discounts an additional inducement for orders for May to September shipment was made in the form of an additional rebate which gave a differential in price of at least 3 per cent less than the average monthly price of the corresponding grade shipped from October, 1926, to April, 1927, inclusive, this differential to be based on the average list price, less quantity discount, during the two periods May to September and October to April, the rebate to be computed separately on each grade of potassium salt, and the average differential rebate due buyers to be paid not later than May 31, 1927. On potash ordered for delivery ex-store an extra charge of $1.60 per short ton gross weight is added, this charge being net and providing delivery f. o. b cars, place of shipment.

SUMMARY OF WORLD'S PRODUCTION

The following table, compiled by L. M. Jones, of the Bureau of Mines, lists the countries that in the last five years have produced potassium salts, and gives the available figures for their production of crude salts and K_2O content. The list of countries differs somewhat from that given in the table of imports, because in that table some of the countries from which the imports came were not themselves producers but received their supply from other countries. Both tables, however, clearly show the predominance of Germany and Alsace as producers of potash.

World's production of potash minerals and content of K_2O, 1922–1926, in metric tons

Country and mineral	1922		1923		1924		1925		1926	
	Output	K_2O content	Output	K_2O content	Output	K_2O content	Output	K_2O content	Output	K_2O content
Australia:										
New South Wales, alunite	188	23	1,014	82	1,024	89	540	45	589	(1)
South Australia, alunite	97									
China[2]	493	(1)	479	(1)	587	(1)	336	(1)	(1)	(1)
France (Alsace), crude salts	1,326,859	[3]211,674	1,577,512	[3]262,170	1,664,605	[3]271,625	1,926,346	[3]311,892	1,664,608	[3]366,670
Germany, crude salts	13,079,447	[3]1,301,900	11,348,424	[3]1,059,700	8,091,117	[3]895,600	12,085,300	[3]1,353,100	8,072,440	(1)
India (British), nitrate of potash	11,860	4,744	8,856	3,542	8,680	3,472	[2]6,450	2,580	(1)	(1)
Italy:										
Alunite			135	(1)	852	(1)	1,500	(1)	1,600	(1)
Leucite rock	18,000	(1)	8,728	(1)	15,600	1,264	226,000	18,000	35,000	(1)
Japan, alunite	1,178	100	19,255	(1)	10	(1)	113	(1)	(1)	(1)
Poland:										
Kainite	2,520	15,479	22,128	29,404	23,545	2,355	62,823	6,282	79,166	31,910
Sylvinite	43,563		39,375		57,875	15,626	115,980	31,315	128,523	
Spain:										
Crude salts							27,734	4,021	80,598	(1)
Potassic earth			3,000	75	1,000	29	1,000	29	950	(1)
United States, crude salts	22,839	10,627	35,406	18,339	39,675	20,777	46,779	23,086	42,024	21,197

[1] Data not available. [2] Exports. [3] Figures relate to merchantable products.

MAGNESIUM AND ITS COMPOUNDS

By J. M. Hill [1]

INTRODUCTION

For many years magnesite, the normal carbonate of magnesium, and dolomite, or high-magnesium limestone, were the only commercial sources of magnesian products in the United States. Other natural compounds are magnesium chloride and magnesium sulphate. The manufactured compounds include the basic (or "technical") carbonate, calcined and dead-burned magnesite, dead-burned dolomite, and precipitated carbonate and sulphate derived from magnesite or dolomite, or from the crude sulphate.

This report includes only the dolomite that is produced for its magnesium content.

The uses to which magnesite has been or may be put, for most of which dolomite is also used, are as follows:[2]

In the manufacture of carbon dioxide and the sulphite process of paper manufacturing, in both of which magnesite has been largely displaced by cheaper dolomite or limestone; for refractory brick, shapes, crucibles, and furnace hearths, for which both dead-burned magnesite and dead-burned dolomite are used; for medicinal and toilet preparations, which are made from magnesite, dolomite, and natural magnesium sulphate; for pipe covering (mixed with asbestos), which in this country is made from dolomite; for oxychloride (Sorel) cement, which is made from a mixture of caustic calcined magnesite and magnesium chloride; as an absorbent in the manufacture of dynamite, an accelerator in the vulcanization of rubber, fused magnesia for insulation at exceedingly high temperatures, and an adulterant of paint—all of which presumably call for calcined magnesite but are relatively unimportant in the consumption of domestic magnesite; and for metallic magnesium, which is made from calcined magnesite and from magnesium chloride.

MAGNESITE

DOMESTIC PRODUCTION

In 1926 mines in the United States produced 133,500 short tons of crude magnesite, valued at $1,200,830, an increase of 11 per cent in quantity but a decrease of 16 per cent in value, as compared with 1925. The value for the total crude magnesite is determined by arbitrary valuations f. o. b. shipping points; these averaged $11.20

[1] Helen M. Gaylord, of the Bureau of Mines, assisted in the preparation of this report. Figures on imports and exports were compiled from records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, of the Bureau of Mines.

[2] These uses are reviewed in detail in U. S. Geol. Survey Bull. 355, 1908. Brief comments on magnesium chloride, sulphate, basic carbonate, metallic magnesium, and their uses appear in the chapter on magnesite in Mineral Resources for 1914, pp. 573–577.

a ton in California, a decrease of $2.30 a ton, and $7.50 a ton in Washington, a decrease of $2.50 a ton, as compared with 1925. Of the total output for 1926, 53,940 tons was produced in California and 79,560 tons in Washington. Most of the production in California was sold as caustic calcined magnesite, and most of that in Washington was sold dead-burned.

Four producers in California in 1926 operated at five localities in four counties. In Washington one company produced crude magnesite from deposits near Chewelah, in Stevens County.

Producers reported that, at the end of 1926, 4,340 tons of crude magnesite, as compared with 3,190 tons in 1925, was in stock on dumps, exclusive of large quantities of fines held at several dumps for eventual calcination.

Domestic magnesite (expressed as equivalent crude) sold or treated in the United States, 1917–1926

Year	California		Washington		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	211,663	$2,116,630	105,175	$783,188	316,838	$2,899,818
1918	84,077	761,811	147,528	1,050,790	231,605	1,812,601
1919	50,020	504,973	106,206	743,442	156,226	1,248,415
1920	81,782	1,083,262	221,985	1,664,888	303,767	2,748,150
1921	47,904	510,177			47,904	510,177
1922	[1] 55,790	[1] 571,745	(1)	(1)	55,790	571,745
1923	73,350	938,600	73,900	165,100	147,250	1,103,700
1924	67,240	901,700	52,860	139,600	120,100	1,041,300
1925	64,600	872,100	56,060	560,600	120,660	1,432,700
1926	53,940	604,130	79,560	596,700	133,500	1,200,830

[1] Washington included with California. Bureau of Mines not at liberty to publish figures.

Magnesite of domestic origin sold, 1922–1926

Year	Crude			Caustic calcined			Dead-burned		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Total	Average		Total	Average		Total	Average
1922	1,300	$13,330	$10.25	21,990	$813,630	$37.00	2,200	$51,260	$23.30
1923	6,020	78,260	13.00	28,470	1,035,740	36.38	34,410	671,000	19.50
1924	1,570	20,410	13.00	26,520	883,120	33.30	29,830	787,500	26.40
1925	2,090	26,290	12.58	23,900	782,700	32.75	29,110	923,960	31.74
1926	1,540	17,440	11.32	18,580	596,370	32.10	42,540	1,089,680	25.62

CRUDE MAGNESITE

In 1926 the quantity of domestic magnesite sold crude by the producers was 1,540 short tons, part of which was later calcined for use as plaster. The average value was $11.32 a ton. A small quantity of crude magnesite was used by makers of high-grade refractory products, and a much smaller quantity of carefully selected magnesite was sold for the manufacture of metallic magnesium. The largest part of the magnesite sold crude was for the manufacture of magnesium chemicals.

CAUSTIC CALCINED MAGNESITE

The domestic caustic calcined magnesite sold in 1926 amounted to 18,580 short tons, a decrease of 22 per cent as compared with 1925, with an average value of $32.10 a ton; 93 per cent came from mines in California. The largest producers of caustic calcined magnesite were C. S. Maltby, the Sierra Magnesite Co., the California Magnesia Co., and Northwest Magnesite Co.

DEAD-BURNED MAGNESITE

The domestic dead-burned magnesite sold in the United States in 1926 amounted to 42,540 short tons, an increase of 46 per cent as compared with 1925, with an average value of $25.62 a ton, a decrease of $6.12 a ton as compared with the previous year. Ninety per cent of the dead-burned output was produced in Washington, but some was produced in San Benito, Santa Clara, and Tulare Counties, Calif.

MARKET AND PRICES

In 1926 the market for domestic magnesite of all grades was fair to poor, and producers still insist that east of Chicago they can not compete with foreign magnesite. In the Atlantic Coast States caustic calcined magnesite from India and from Greece is still sold cheaper than domestic material of equal grade.

Operators reported only small sales of domestic crude magnesite at $7.50 to $12.65 a ton, but the average price of the crude magnesite sold in 1926 was $11.32 a ton. Crude magnesite was imported in the eastern markets in 1926 at an average declared value of $10.78 a ton.

Domestic grade A caustic calcined magnesite was quoted [3] at $40 to $42 a ton ground, f. o. b. plants in California, at the first of the year, but declined to $38 to $42 in March, rose to $45 in May, was $40 in June and July, $44 in August and September, $45 in October, $42.50 in November, and $40 in December. Grade B was quoted at $38 a ton throughout the year. Producers reported sales of domestic caustic calcined magnesite at prices ranging from $20 to $39.61 a ton but the average selling price was $32.10 a ton f. o. b. shipping point. The average value of imported caustic magnesite was $22.26 a ton.

Domestic dead-burned magnesite was quoted [3] at $40 a ton delivered eastern seaboard in January, but in February the quotation dropped to $35 and in September to $33, at which figure it remained throughout the balance of the year. Producers reported the bulk of sales at $30 a ton f. o. b. California plants and $25 a ton f. o. b. Washington plants.

[3] Engineering and Mining Journal: Vols. 121 and 122, 1926.

Average value per short ton of domestic and imported magnesite, 1922–1926

Year	Domestic [1]			Imported [2]		
	Crude	Caustic calcined	Dead-burned	Crude	Calcined, not purified	
					Caustic calcined	Dead-burned
1922	$10.25	$37.00	$23.30	$13.31	$17.54	
1923	13.00	36.38	19.50	8.51	$28.10	$11.46
1924	13.00	33.30	26.40	14.17	23.44	16.32
1925	12.58	32.75	31.74	13.10	24.29	14.54
1926	11.32	32.10	25.62	10.78	22.26	14.64

[1] Value f. o. b. mine shipping point. [2] Declared value.

Separate figures for imports of caustic calcined and dead-burned magnesite are not available prior to September 22, 1922, but the writer estimates that the average value for dead-burned magnesite imported in 1922 was $12.92 a ton.

The companies in California and Washington named below produced magnesite in 1926. Most of the producers sell the calcined products, though some crude can possibly be had from any of them.

California: California Magnesia Co., Monadnock Building, San Francisco; Gray Eagle Magnesite Co., 564 Market Street, San Francisco; C. S. Maltby, Humboldt Bank Building, San Francisco; Sierra Magnesite Co., Balfour Building, San Francisco.

Washington: Northwest Magnesite Co., Crocker Building, San Francisco, Calif.

The market for plastic magnesite was depressed; that for dead-burned magnesite was better than in 1925. Domestic producers requested that the Tariff Commission reopen the question of an increase of the import tariff. A hearing was held in Washington June 21, 1926, but up to August 29, 1927, no decision has been announced.

IMPORTS

Magnesite, not purified, imported into the United States, 1922–1926, by countries, in short tons

[General imports]

Country	1922	1923	1924	1925	1926
Africa, British South			(1)	34	
Austria		1,675	156		7,028
Belgium	50	101	54	433	303
Canada	973	427	124	95	41
Czechoslovakia	7,781			100	1,688
Denmark and Faroe Islands					360
France			28		
Germany	20,074	162	206	275	169
Greece	1,120	5,510	110	408	594
India, British	3,297	7,576	8,011	9,933	9,223
Italy	94,930	65,262	54,619	51,521	68,269
Kwantung					25
Netherlands	5,379	4,406	5,348	4,752	3,944
Norway				23	
Poland and Danzig		1			
Rumania		24			
United Kingdom:					
England	59	162	548	1,543	902
Scotland	595	729	1,202		
	134,258	86,035	70,406	69,117	92,546

[1] 595 pounds.

Magnesite, not purified, imported into the United States in 1926

[General imports]

Country	Crude		Caustic calcined		Dead-burned and grain (not suitable for manufacture into oxychloride cements)	
	Pounds	Value	Pounds	Value	Pounds	Value
Austria			374,118	$3,725	13,682,485	$107,932
Belgium			556,894	8,967	48,468	891
Canada			81,500	1,513		
Czechoslovakia			95,658	1,654	3,280,800	28,778
Denmark and Faroe Islands					720,000	6,326
Germany	754	$38	338,388	5,397		
Greece	1,187,200	6,360				
India, British			18,446,071	154,453		
Italy			55,434	916	136,483,400	984,890
Kwantung	21,860	136	27,727	371		
Netherlands	6,394	21	7,881,379	119,880	320	6
United Kingdom			1,803,510	33,255		
	1,216,208	6,555	29,660,679	330,131	154,215,473	1,128,823

Magnesite imported for consumption in the United States, 1917–1926

Year	Crude		Calcined, not purified	
	Short tons	Value	Short tons	Value
1917	30,277	$232,105	3,966	$232,601
1918	5,432	103,233	19,049	824,022
1919	6,381	103,311	9,471	270,721
1920	33,550	406,204	14,780	373,165
1921	51,993	525,452	6,788	250,932
1922	73,331	976,283	72,265	1,267,622
1923	5,182	44,081	72,955	1,022,968
1924	6	85	64,785	1,172,403
1925	487	6,382	68,395	1,160,830
1926	608	6,555	90,293	1,438,765

EXPORTS

No exports of magnesite, either crude or calcined, were reported during 1926, but materials made of magnesia (including pipe and boiler coverings) having a weight of 6,579,221 pounds and valued at $323,386 were exported as compared with 5,264,203 pounds, valued at $316,978, in 1925.

IMPORTED STOCKS

Stocks of imported magnesite in bonded warehouses averaged 14,187 short tons a month during 1926. The largest amount was 14,342 tons, in November, and the lowest 14,013 tons, in February. Since June, 1926, bonded stocks of caustic and dead-burned have been shown separately; the stock of caustic was about 13,130 short tons and of dead-burned 1,050 short tons a month.

ANNUAL SUPPLY

The annual additions to supply of magnesite may be considered as domestic production plus imports, for there are no exports of crude or calcined magnesite. Such estimates have been called "consump-

tion," but they do not take into account stocks held at consuming plants.

Magnesite supply in the United States, 1925–26, in short tons

Class	1925			1926		
	Sales (domestic)	Imports for consumption	Total new supply	Sales (domestic)	Imports for consumption	Total new supply
Crude	2,090	487	2,577	1,540	608	2,148
Caustic calcined	23,900	17,075	40,975	18,580	14,758	33,338
Dead-burned	29,110	51,320	80,430	42,540	75,535	118,075

DOMESTIC INDUSTRY

California.—Palmer [4] has recently described the magnesite deposits at Red Mountain and Sampson Peak and has given details of the methods of mining, calcining, and handling at the plants operated by C. S. Maltby.

No work was done on the magnesite mines in Napa, Placer, and Sonoma Counties in 1926. The Gray Eagle Magnesite Co. operated the Gray Eagle mines and stack furnace near Chinese Camp, Tuolumne County, part of the year. In Tulare County the Sierra Magnesite Co. was the largest producer and began dead-burning, but the California Magnesia Co. made a relatively small output of caustic calcined. C. S. Maltby produced dead-burned magnesite from the Sampson Peak, San Benito County, deposits but closed the plant in October because of road conditions on the 60-mile haul to Mendota. Maltby's Red Mountain mines in Santa Clara County, 30 miles southeast of Livermore, supplied the largest part of the California output. A few tons of dead-burned magnesite was produced at this plant late in the year. No magnesite was shipped from the Stanislaus County side of Red Mountain, but the Red Mountain Magnesite Co. began construction of a new calcining plant to handle 3,000 tons monthly at the California magnesite mine west of Patterson and did a large amount of work in reopening the deposit. It is expected that the plant will be in operation in April, 1927.

Washington.—The Northwest Magnesite Co. operated the Finch mine near Chewelah, Stevens County, and increased its production of dead-burned magnesite by 50 per cent. Caustic calcined magnesite was also produced and some crude magnesite sold, which was presumably later burned for plastic use. For the first time in several years two of the six furnaces at its plant were in operation. The Double Eagle mine near Valley, Stevens County, was not worked for magnesite.

FOREIGN INDUSTRY

Austria.[5]—The Austro-American Magnesite Co., founded in 1908 by American capital, has recently been reorganized in cooperation with the Wiener Bankverein and in the future will be known as the

[4] Palmer, Leroy C., Magnesite Mining in California: Am. Inst. Min. and Met. Eng., Pamphlet 1629-H, February, 1927.
[5] Bureau of Foreign and Domestic Commerce Foreign Trade Notes No. 131-132.

Oesterreichisch-Amerikanische Magnesit-Aktiengesellschaft. This company is one of the largest producers of magnesite in Europe and the largest producer in Austria. In 1925 exports of magnesite from Austria by this company were 80,000 metric tons, of which 44,500 tons went to the United States.

Canada.—A total of 41 tons of caustic calcined magnesite was imported from Canada in 1926.

China.—A few tons of crude and caustic calcined magnesite were received in the United States from Kwantung, China, in 1926. Niinomy [a] has given further data in support of his theory that the immense deposits of magnesite on Niu-hsin-shan hill are replacement deposits formed from dolomite.

Greece.—Production of crude magnesite in Greece in 1925 was 90,828 metric tons.

India.—It is reported that the makers of magnesium chloride are seeking a protective tariff on their products.

Mexico.—What is reported to be a large deposit of magnesite in Lower California, south of Turtle Bay, was examined by American interests in 1926.

Venezuela.—Apparently the deposit on Margarita Island was not productive in 1926, though there was a report in 1925 that an American company was preparing to reopen the mine.

WORLD'S PRODUCTION

World's production of magnesite, 1921–1925, by countries, in metric tons [1]

[Unless otherwise stated, the quantities in this table represent crude magnesite mined]

Country	1921	1922	1923	1924	1925
Australia:					
New South Wales	12,465	3,424	6,228	12,697	14,237
South Australia	175	585	168	131	357
Victoria	130	99	76	77	92
Western Australia			[2] 2		
Austria [3]	160,823	281,247	180,292	156,868	164,282
Canada	8,447	7,873	12,079	9,512	[4]
Cyprus	305	[2] 895	[2] 284	[2] 224	
Czechoslovakia [5]	48,578	92,942	64,030	60,044	69,532
Greece	60,132	56,642	62,552	65,604	90,828
India, British	20,338	19,582	19,748	24,854	30,095
Italy	9,410	8,700	12,474	13,436	14,146
Norway	[6] 210	738	2,359	1,976	1,699
Russia	14,915	10,567	[7] 15,429	[4]	[4]
Spain		303			
Union of South Africa	1,803	997	1,387	2,001	1,823
United States (sold or treated)	43,458	50,612	133,582	108,952	109,460
Venezuela (exports)	2,400				

[1] Compiled by L. M. Jones, of the Bureau of Mines.
[2] Exports.
[3] Data relate to exports of crude and sintered magnesite, the sintered being reduced to crude on the basis of 2.1 tons of crude to 1 ton sintered. In addition, the following quantities of caustic magnesia were exported in the years under review: 1921, 8,252 tons; 1922, 12,635 tons; 1923, 5,341 tons; 1924, 6,431 tons; 1925, 10,684 tons. In 1922 the companies operating reported an output of 427,556 tons of crude magnesite. Similar data for other years are not available.
[4] Data not available.
[5] Exports, less imports, of crude and sintered magnesite, the sintered being reduced to crude on the basis of 2.1 tons crude to 1 ton sintered.
[6] Exports of crude and sintered magnesite, the sintered being reduced to crude on the basis of 2.1 tons crude to 1 ton sintered.
[7] Year ended Sept. 30.

[a] Niinomy, K., Magnesite Deposits of Manchuria: Econ. Geol., vol. 22, 1927, pp. 195-199.

DOLOMITE[6]

DOLOMITE PRODUCTS

Dolomite sold for uses that are, or have been, also supplied by magnesite increased in quantity in 1926 because of the increased tonnage reported as sold or used for refractories. The approximate quantity of crude dolomite used in the manufacture of these products is as follows:

Crude dolomite sold by producers in the United States for certain uses, 1917–1926, in short tons

[Includes dead-burned dolomite, basic magnesium carbonate, sulphite process of paper manufacture, and making of carbon dioxide]

1917	937,000	1922	1,074,000
1918	1,413,000	1923	1,226,000
1919	947,000	1924	1,239,000
1920	1,580,000	1925	1,425,000
1921	499,000	1926	1,480,000

DEAD-BURNED DOLOMITE

The principal dolomite product included in the category of dead-burned dolomite is that for refractory use. Some manufacturers of this product buy their stone, the sales of which are reported by the quarry companies in terms of crude stone; others quarry their own stone and report only in terms of dead-burned material. The two kinds of material are represented in the accompanying table, as well as the estimated total output in terms of dead-burned dolomite.

Dead-burned dolomite sold or used by producers in the United States, 1917–1926

Year	Reported as raw stone		Reported as dead-burned		Total quantity calculated as dead burned (short tons)
	Short tons	Value	Short tons	Value	
1917	232,421	$171,257	232,300	$2,376,633	349,000
1918	490,863	560,209	318,896	4,097,819	564,000
1919	254,787	394,754	222,036	2,228,602	349,000
1920	612,800	742,020	316,293	3,732,522	623,000
1921	79,480	85,786	107,664	1,113,010	147,000
1922	146,640	172,251	348,838	2,813,946	422,200
1923	205,890	249,993	357,642	3,599,116	460,600
1924	309,010	287,137	328,659	3,209,257	483,200
1925	415,710	375,315	392,145	3,730,509	600,000
1926	511,300	458,802	386,715	3,593,731	642,000

BASIC MAGNESIUM CARBONATE

Basic magnesium carbonate, or "technical carbonate," used in "85 per cent magnesia" pipe and boiler coverings decreased in output in 1926. The manufacturers of this product both buy and quarry their stone but do not report their output of finished product. The crude stone used for this purpose has been reported as follows:

[6] Figures on dolomite compiled by A. T. Coons, of the Bureau of Mines.

Dolomite sold or used by producers in the United States for manufacture of basic magnesium carbonate, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	73,214	$89,189	1922	53,170	$79,313
1918	90,989	126,255	1923	116,410	146,337
1919	62,652	82,619	1924	98,160	129,390
1920	57,300	107,107	1925	98,980	131,440
1921	32,050	60,648	1926	72,850	110,560

HIGH-MAGNESIUM LIME FOR SULPHITE PAPER MILLS

An estimate of the high-magnesium lime sold to sulphite paper mills is given below. Exact figures are impossible to obtain, as many lime producers who sell burned lime to paper mills do not specify the kind of paper mill. The quantity sold is expressed as burned lime.

High-magnesium lime sold by producers in the United States to sulphite paper mills, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	77,020	$422,026	1922	70,000	$650,000
1918	88,631	726,610	1923	75,000	750,000
1919	83,962	632,930	1924	70,000	625,000
1920	121,817	1,347,321	1925	53,000	451,000
1921	68,992	711,345	1926	52,600	482,000

CARBON DIOXIDE

Sales of crude dolomite for the manufacture of carbon dioxide, as reported from California and Georgia, are as follows:

Dolomite sold by producers in the United States for the manufacture of carbon dioxide, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	31,000	$53,955	1922	38,280	$58,748
1918	16,770	22,500	1923	38,460	52,494
1919	16,870	39,895	1924	34,600	57,105
1920	33,040	73,671	1925	19,740	36,854
1921	34,090	124,984	1926	16,520	31,424

MAGNESIUM

PRODUCTION

The sales of domestic metallic magnesium, 1917 to 1926, are given in the table that follows:

Domestic metallic magnesium sold or used in the United States, 1917–1926

Year	Pounds	Value	Average price per pound		
			Ingot	Powder	Sheet, wire, and castings
1917	115,813	$233,626	$2.02		
1918	284,118	615,217	1.81	$2.67	
1919	127,465	247,302	1.83	2.85	
1920	[1]	[1]	1.60	2.75	
1921	48,000	86,000	1.30	2.36	
1922	[2] 60,000	[2] 89,000	1.60	1.13	
1923	[2] 125,000	[2] 155,000	1.25	1.00	$3.60
1924	[2] 128,000	[2] 150,000	[3] 1.07	[4] 1.10	3.50
1925	245,000	274,400	.86	1.63	3.00
1926	322,650	390,400	.80	1.64	2.90

[1] Bureau of Mines not at liberty to publish figures.
[2] Estimated.
[3] Prices ranged from as low as 90 cents in large contracts to $1.10 for small quantities. The published price established about Mar. 1, 1924, was $1.
[4] This price is an average for old powder sold in competition with old imported stocks and for new powder, manufacture of which began in October, 1924, at a sales price of $1.50 a pound.

The American Magnesium Corporation, of Niagara Falls, N. Y., and the Dow Chemical Co., Midland, Mich., reported production and sale of domestic magnesium made from calcined magnesite and magnesium chloride. The Elektron Metals Corporation of America suspended operations in 1924, did not report in 1925, and in 1926 reported that no metal was imported and none produced by it in the United States. Total sales of domestic magnesium in 1926 increased 32 per cent and reflect a healthy growth in market development. Sales of ingot increased nearly 19 per cent; the greatest increases were in castings, eleven times as large, and in wire and tubing, four times as large, as in 1925.

The decrease in the average price of ingot and the continued increase in that of powder are noteworthy.

Castings made by the Dow Chemical Co. and the American Magnesium Corporation include aircraft parts, such as crank cases, oil pans, pistons, control pulleys, gasoline-line fittings, bearings, instrument parts, control levers, hinges, steps, and supercharger castings; also microscope parts, lens holders, field glasses, parts for moving-picture machines and surveying instruments, golf-club heads, artificial limbs, impellers for air compressors, shuttles, and special bobbins. The average price of magnesium in castings decreased approximately 6 cents a pound. Undoubtedly the price of magnesium can be further reduced as the volume of consumption increases.

IMPORTS

Magnesium imported for consumption in the United States, 1918–1926

Year	Pounds	Value	
		Total	Average
1918—July to December [1]	11,899	$16,259	$1.37
1919	13,239	13,583	1.02
1920	29,275	25,055	.85
1921	39,913	30,592	.77
1922	182,939	54,448	.30
1923	13,974	11,576	.83
1924	8,738	6,561	.75
1925	8,326	7,070	.85
1926	10,117	4,750	.47

[1] Not separately recorded prior to July, 1918.

Magnesium imported for consumption in the United States, 1925–26, by classes

Class	1925			1926		
	Pounds	Value		Pounds	Value	
		Total	Average		Total	Average
Magnesium, metallic and scrap	1,859	$889	$0.478	7,927	$2,144	$0.270
Alloys (magnesium content)	2,794	1,719	.615			
Powder (magnesium content)	2,513	3,139	1.249	1,440	1,580	1.097
Sheets, tubing, ribbons, wire, and all other articles of magnesium	1,160	1,323	1.141	750	1,026	1.368
	8,326	7,070	.849	10,117	4,750	.470

DEVELOPMENT AND OUTLOOK

The use of magnesium as a deoxidizer and desulphurizer continues to broaden. All manufacturers of nickel and monel metal depend on magnesium, and it is still important as a scavenger for brass and bronze.

The demand for aluminum-magnesium alloys in 1926 was eleven times greater than in 1925. The properties of these alloys are becoming better understood, and their fabrication, heat treatment, and cold working are constantly being improved, making possible the manufacture of products of superior quality and finish. The demand for high-strength aluminum alloys in which magnesium up to 0.5 per cent is essential is increasing. The corrosion of magnesium has received particular attention.[7]

The new magnesium powder introduced in 1924 is receiving general approval; its large bulk and low specific gravity are insuring increased consumption.

Important progress has been made in the manufacture of sheet and plate. Magnesium sheet of excellent appearance and good physical properties is now produced with comparative ease. The American Magnesium Corporation is rolling a magnesium-alloy plate of a size and strength suitable for aircraft propellers. Larger quantities of sheets of thin gauge are used in radio rectifiers.

[7] The corrosion of magnesium and the magnesium-aluminum alloys containing manganese: Nat. Adv. Comm. on Aeronautics Rept. No. 248, 1927.

Manufacture of extruded rod and tubing has been improved by the addition of drawing equipment that makes possible the manufacture of articles within definite tolerances and with improved physical properties, and sales have increased.

The demand for magnesium wire has increased fourfold as compared with 1925. Degasification of radio tubes continues to consume the major part of the ribbon and wire sold.

The high cost of manufacture is still the greatest difficulty in the development of a market for magnesium. Total sales of commercial products are hardly sufficient to permit a substantial reduction in selling price; but the field is gradually broadening and reductions in costs and in sales prices are to be expected with the expanding market.

MAGNESIUM SALTS

The total domestic production of magnesium salts from deposits of epsomite and from salt-works bittern waters in 1926 was 76,560,000 pounds, valued at $1,040,800, a decrease of 11 per cent in quantity and 17 per cent in value as compared with 1925.

The epsomite deposits near Oroville, Wash., were idle most of the year, and the Whitney Chemical Co. plant at Redwood City, Calif., now part of the Leslie California Salt Co., was closed, though the company sold some magnesium salts from stocks.

MAGNESIUM CHLORIDE

Commercial magnesium chloride (guaranteed 97 per cent $MgCl_2.6H_2O$) made from brines and bittern waters was produced and sold by four companies in 1926—Arden Salt Works, Arden, Calif.; California Chemical Co., Chula Vista, Calif.; Dow Chemical Co., Midland, Mich.; and the Oliver Salt Co., Mount Eden, Calif. The total sales of flake chloride in 1926 were 45,630,000 pounds, valued at $674,680; the average price was $0.0148 a pound. Besides the flake chloride there was produced 6,939,000 pounds of chloride in liquid form, ranging from 23° to 36° B., that was sold as road liquor at an average of $0.0039 a pound, an increase of 185 per cent in quantity and of 1 per cent in value.

Magnesium chloride imported for consumption in the United States, 1918–1926

Year	Anhydrous			Total		
	Pounds	Value		Pounds	Value	
		Total	Average		Total	Average
1918	(1)	(1)		[2] 13,076	[2] $1,619	$0.124
1919	(1)	(1)		11,200	538	.048
1920	(1)	(1)		454,334	7,098	.016
1921	(1)	(1)		7,365,812	85,727	.012
1922	(1)	(1)		11,403,837	113,618	.010
1923	56,110	$2,703	$0.048	23,052,385	190,748	.008
1924	136,082	1,820	.013	15,200,433	85,206	.006
1925				15,922,254	105,462	.007
1926				16,093,867	110,477	.007

[1] Not separately recorded. [2] Not separately recorded prior to July, 1918.

MAGNESIUM SULPHATE

Natural magnesium sulphate was produced from epsomite in 1926 by the Epso Products Co., near Oroville, Wash., during the first of the year. The American Magnesium Co., in southern California, was developing its deposit but made no shipments. Epsom salts was made from natural brines and bitterns by the Dow Chemical Co., at Midland, Mich., and by the Oliver Salt Co., at Mount Eden, Calif.

The table following gives the total sales of these producers:

Magnesium sulphate sold by producers in the United States, 1923–1926

Year	Pounds	Value	
		Total	Average
1923	14,300,000	$231,000	$0.016
1924	18,839,901	293,167	.016
1925	22,931,000	341,679	.015
1926	23,991,000	339,220	.014

Some of this magnesium sulphate was exported to Canada but was not separately recorded by the Bureau of Foreign and Domestic Commerce. Imports of magnesium sulphate (Epsom salts) are shown in the following table:

Magnesium sulphate (Epsom salts) imported for consumption in the United States, 1917–1926

Year	Pounds	Value	
		Total	Average
1917	54,200	$875	$0.0161
1918	2,045	196	.0958
1919	17,647	1,473	.0835
1920	1,803,769	66,944	.0371
1921	12,519,778	88,153	.0070
1922	25,390,734	200,203	.0079
1923	14,455,920	71,566	.0050
1924	8,881,181	57,579	.0065
1925	8,211,228	50,466	.0061
1926	10,600,582	61,018	.0058

MANUFACTURED MAGNESIUM SALTS

Statistics in the preceding pages deal with substances as they left the producer of the raw material. Other figures are compiled biennially by the Bureau of the Census, which show the quantity and value of manufactured magnesium salts. The raw materials from which these salts were made may include dolomite, magnesite, crude magnesium sulphate, and crude magnesium chloride, but the quantities of these materials so used have not been reported. They are partly or wholly included in the figures of production already given.

Imports of magnesium compounds not shown elsewhere in this report are given in the table that follows:

Magnesium compounds imported for consumption in the United States, 1917–1926

Year	Calcined magnesia, purified		Carbonate, precipitated	
	Pounds	Value	Pounds	Value
1917	34,808	$11,819	23,197	$4,295
1918	523	312		
1919	22,637	11,358	5,094	1,101
1920	26,859	9,093	14,930	1,512
1921	35,182	7,593	18,514	2,061
1922	96,792	15,969	36,254	3,385
1923	141,375	30,802	1,046,990	55,137
1924	101,998	29,252	481,439	25,333
1925	162,790	43,356	190,413	13,004
1926	520,394	51,454	241,293	16,142

GYPSUM

By R. M. Santmyers and Jefferson Middleton

INTRODUCTION

Although the production of crude gypsum during 1926 showed a slight decline from that of 1925, the demand for finished products and the even course of the market indicated that the industry was in a healthy condition.

One of the outstanding features of the year was the steady increase in the demand for gypsum specialties, notably wall board. The expansion of the gypsum industry extended to virtually every section of the country and included the opening of new mines and the erection of plants for the manufacture of all gypsum products.

Canadian gypsum, especially that from Nova Scotia, played an important part in the industry both in Canada and the United States. Because of the increased demand for gypsum from the new plants and the extensions to existing plants in Canada and along the eastern seaboard of the United States, there was considerable expansion in the mining of raw gypsum rock in Nova Scotia and New Brunswick. American establishments extended their interests into these two Provinces during the year, and several new plants are under construction. On the other hand, the Canadian Cement Co. of Montreal took over the plant of the Keystone Plaster Co. (now the Pennsylvania Gypsum Co.) at Chester, Pa., and will use gypsum from Nova Scotia for the manufacture of the usual gypsum products.

About 12 incorporations and corporate changes were reported in the field of gypsum products manufactured in 1926; their total capitalization was $20,000,000, including capital increases by going concerns. According to Rock Products, December 25, 1926, the United States Gypsum Co. easily led in investment and the erection of new plants during the year; its activities included a complete new plant at Detroit, Mich.; a paper mill at Oakfield, N. Y.; a specialty plant at Brighton, N. Y.; a new wall-board plant on Staten Island, N. Y.; many new warehouses; increases in mill and wall-board capacities at Sweetwater, Tex., Southard, Okla., and Plasterco, Va., averaging more than 50 per cent; and the opening of several new offices, especially along the west coast. It is estimated that the United States Gypsum Co. expended between $5,000,000 and $6,000,000 on new construction. Plans were also formulated during the latter part of the year for the erection of a $1,000,000 chip mill at Kansas City, Mo., to make wood chips or fiber for the wall-board plants in Iowa, Texas, and Oklahoma.

PRODUCTION

The quantity of gypsum mined in the United States in 1926 was 5,635,441 short tons, a decrease of 42,861 tons, or less than 1 per

cent, compared with 1925. The value of the sales of uncalcined and calcined gypsum by producers was $46,721,219, a decrease of $856,021, or 2 per cent, as compared with the previous year. Of the total quantity mined, 961,363 tons was sold without calcining, a decrease of 52,772 tons, or 5 per cent, as compared with 1925; the quantity of calcined gypsum sold was 4,015,974 tons, a decrease of 80,383 tons, or 2 per cent. The value of the gypsum sold without calcining was $2,509,885, or $2.61 per ton, and that of calcined gypsum sales was $44,211,334, or $11.01 per ton.

New York, Iowa, and Michigan were the largest producers of crude gypsum. New York, however, showed a slight decline from the figures for the year before, registering an output of 1,723,460 tons in 1926 as compared with 1,730,254 tons in 1925. Iowa produced 802,910 tons in 1926, an increase of 2,743 tons, and Michigan 659,685 tons, an increase of 10,632 tons over 1925.

Other important States in the production of crude gypsum in 1926 were: Texas, 533,156 tons; Ohio, 521,205 tons; Nevada, 350,972 tons; and Oklahoma, 324,021 tons.

New York was the largest seller of uncalcined and calcined gypsum; 328,086 tons of the former (or 34 per cent of the total) and 1,246,822 tons of the latter (or 31 per cent of the total) were marketed in that State in 1926. These figures represent a decrease of 7 per cent in the quantity of uncalcined and an increase of 5 per cent in that of calcined gypsum as compared with 1925.

The quantity of crude sold as agricultural gypsum by producers in 1926 was 27,294 tons, valued at $151,916, as compared with 26,001 tons, valued at $153,902 in 1925, an increase of 5 per cent in quantity and a decrease of 1 per cent in value.

The quantity of Keenes cement sold by producers in 1926 was 42,436 tons, valued at $603,781, an increase of 16 per cent in quantity and 20 per cent in value.

With the exception of partition tile, the output of gypsum building specialties showed a favorable increase over that for 1925. Plaster board increased 14 per cent in quantity to 126,182 tons, but decreased 18 per cent in value; wall board increased 15 per cent to 484,740 tons and 11 per cent to $15,344,886; special tile and blocks increased 232 per cent to 28,730 tons and 223 per cent to $315,097. Partition tile decreased from 245,853 tons to 231,571 tons, or 6 per cent, and from $2,542,228 to $2,476,807, or 3 per cent.

Gypsum mined and uncalcined and calcined gypsum sold by producers in the United States, 1917–1926

Year	Number of active plants	Total quantity mined (short tons)	Sold without calcining		Sold calcined		Total value of sales
			Short tons	Value	Short tons	Value	
1917	59	2,696,226	623,995	$1,124,370	1,677,390	$9,992,082	$11,116,452
1918	57	2,057,015	470,192	1,236,552	1,328,269	10,234,302	11,470,854
1919	57	2,420,163	510,245	1,518,203	1,596,020	14,209,704	15,727,907
1920	61	3,129,142	669,260	2,565,195	1,904,484	21,967,870	24,533,065
1921	62	2,890,784	642,944	2,266,011	1,796,851	21,434,279	23,700,290
1922	64	3,779,949	770,725	2,443,346	2,491,265	26,917,805	29,361,151
1923	62	4,753,448	847,242	2,577,436	3,101,378	32,310,719	34,888,155
1924	72	5,042,629	982,108	2,674,320	3,568,569	40,050,187	42,724,507
1925	61	5,678,302	1,014,135	2,823,229	4,096,357	44,754,011	47,577,240
1926	59	5,635,441	961,363	2,509,885	4,015,974	44,211,334	46,721,219

Gypsum mined and uncalcined and calcined gypsum sold by producers in the United States, 1925–26, by States

State	Number of active plants	Total quantity mined (short tons)	Sold without calcining		Sold calcined		Total value of sales
			Short tons	Value	Short tons	Value	
1925							
Iowa	7	800,167	140,451	$381,584	562,210	$6,352,687	$6,734,271
Kansas	3	166,952	52,869	126,886	87,656	882,624	1,009,510
Michigan	5	649,053	155,961	391,093	477,076	5,056,201	5,447,294
Nevada	6	350,130	31,471	57,073	259,693	1,664,736	1,721,809
New York	9	1,730,254	354,394	1,017,403	1,185,142	15,202,503	16,219,906
Ohio	3	551,479	11,423	32,818	540,504	6,361,314	6,394,132
Oklahoma	4	320,931	(1)	(1)	(1)	(1)	2,599,463
Texas	6	558,132	(1)	(1)	(1)	(1)	3,721,954
Other States [2]	18	551,204	[3] 267,566	[3] 816,372	[3] 984,076	[3] 9,233,946	3,728,901
	61	5,678,302	1,014,135	2,823,229	4,096,357	44,754,011	47,577,240
1926							
Iowa	7	802,910	129,803	296,854	553,498	6,291,349	6,588,203
Kansas	3	195,440	47,641	108,792	111,174	1,111,928	1,220,720
Michigan	5	659,685	157,787	379,848	455,616	4,641,617	5,021,465
Nevada	5	350,972	52,642	102,282	218,670	1,424,953	1,527,235
New York	11	1,723,460	328,086	905,095	1,246,822	15,889,494	16,794,589
Ohio	3	521,205	13,082	38,788	509,522	5,758,433	5,797,221
Oklahoma	3	324,021	(1)	(1)	(1)	(1)	2,301,049
Texas	5	533,156	(1)	(1)	(1)	(1)	4,126,400
Utah	3	36,333	(1)	(1)	(1)	(1)	195,535
Other States [2]	14	488,259	[3] 232,322	[3] 678,226	[3] 920,672	[3] 9,093,560	3,148,802
	59	5,635,441	961,363	2,509,885	4,015,974	44,211,334	46,721,219

[1] Included under "Other States."
[2] 1925: Arizona, California, Colorado, Montana, New Mexico, Oregon, South Dakota, Utah, Virginia, Washington, and Wyoming; 1926: Arizona, California, Colorado, Montana, New Mexico, South Dakota, Virginia, and Wyoming.
[3] This figure includes also sales from States entered as "(1)" above.

Gypsum sold by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Short tons	Value	Short tons	Value
Without calcining:				
To cement mills	979,154	$2,604,727	928,885	$2,326,635
For agriculture	26,001	153,902	27,294	151,916
For other uses	8,980	64,600	5,184	31,334
	1,014,135	2,823,229	961,363	2,509,885
Calcined:				
Stucco	634,714	3,930,714	543,729	3,365,116
Neat plaster	2,187,721	16,737,733	2,150,243	16,066,220
Sanded plaster	184,850	1,331,784	133,255	869,208
Plaster of Paris, molding, casting plaster, etc	[1] 187,058	[1] 1,888,941	[1] 296,226	[1] 2,014,926
Keenes cement	36,607	503,397	42,436	603,781
To plate-glass works	19,536	148,398	14,589	114,767
Plaster board	110,703	2,766,079	126,182	2,258,104
Wall board	422,863	13,812,230	484,740	15,344,886
Partition tile	245,853	2,542,228	231,571	2,476,807
Special tile and blocks	8,654	97,408	28,730	315,097
Other purposes [2]	57,798	995,099	54,273	782,422
	4,096,357	44,754,011	4,015,974	44,211,334
Grand total value		47,577,240		46,721,219

[1] Includes dental plaster.
[2] Includes roof tile, insulating material, fireproofing, etc.

Keenes cement sold by producers in the United States, 1917–1926

Year	Manufacturers	Short tons	Value	Year	Manufacturers	Short tons	Value
1917	3	15,976	$167,191	1922	6	21,991	$324,316
1918	5	12,823	151,802	1923	5	23,273	323,127
1919	6	15,395	200,360	1924	6	30,620	428,684
1920	6	16,542	246,433	1925	5	36,607	503,397
1921	7	14,430	232,457	1926	4	42,436	603,781

CENSUS OF THE INDUSTRY

According to the data collected by the Bureau of the Census through the biennial census of manufactures that was taken in 1926, the establishments engaged primarily in the manufacture of wall board, plaster, and floor composition reported a total output for 1925 valued at $90,957,045, an increase of 23 per cent as compared with $73,800,539 for 1923, the last preceding census.

The chief products of the concerns included in the census were gypsum plaster and other ready-mixed wall plasters and similar preparations, such as hard wall plasters, plaster wainscoting, fiber plaster, stucco, calcined plaster, molding plaster, plaster board, asphalt plastic and ornamental plaster work for interior decoration, gypsum and other wall boards, and floor composition.

In addition, wall plaster, wall board, and floor composition were manufactured to some extent by establishments engaged primarily in other industries. The value of the commodities thus produced outside the industry proper in 1923 was $673,310, an amount equal to 0.9 per cent of the total value of products reported for the industry as classified. The corresponding figures for 1925 were $769,494, or 0.8 per cent of the total value.

Of the 222 establishments manufacturing gypsum products reporting to the Bureau of the Census for 1925, 33 were situated in California, 15 in Illinois, 11 in Iowa, 4 in Kansas, 14 in Michigan, 4 in Nevada, 8 in New Jersey, 41 in New York, 17 in Ohio, 10 in Pennsylvania, 5 in Texas, 5 in Washington, and the remaining 55 in 24 other States.

PRICES AND MARKETS

The price of crude gypsum held fairly steady during the year, except in the Pacific Coast States; there, according to reports, price cutting among sellers of crude gypsum resulted in prices that virtually eliminated all profit. Sales of ground gypsum were made at a price that was beneficial to the industry as a whole, but the price of plaster (hard-wall, sanded, etc.) fluctuated differently in several sections of the United States.

The market for gypsum, both crude and in its manufactured forms, was good, as a whole, throughout the year. Plants equipped for the manufacture of wall board were running at virtually full capacity, and the unprecedented demand for this product was well taken care of. The demand for other gypsum specialties, except partition tile, was greater than during the preceding year.

Several of the plaster-making plants along the west coast and through the Mountain States were considering during the latter part

of the year the expansion of their plants and the addition of machinery for making wall board, in order to compete better in the growing trade, both at home and in the Orient, for this product.

The slight lull in the building-trades industry along the Atlantic seaboard increased the competition among the companies in this region, and, with the fast-growing gypsum industry in Canada extending its activities into the United States, the American industry is seeking possible means of lowering costs of production and marketing.

Prices in January, June, and December of some gypsum products appear in the accompanying table.

Gypsum prices, per short ton in carload lots, in 1926 [1]

	Crushed rock			Ground gypsum			Agricultural gypsum			Stucco, calcined			Keenes cement		
	Jan. 9	June 12	Dec. 11	Jan. 9	June 12	Dec. 11	Jan. 9	June 12	Dec. 11	Jan. 9	June 12	Dec. 11	Jan. 9	June 12	Dec. 11
Douglas, Ariz.	------	------	------	------	------	------	$7.00	$7.00	$7.00	------	------	------	$30.00	$30.00	$30.00
Los Angeles, Calif.	------	$3.00	$3.00	------	$8.00	$8.00	------	8.00–10.40	8.00	$10.30	$10.40–10.70	$8.50–10.70	------	------	------
San Francisco, Calif.	------	------	------	------	------	------	12.00	------	14.00	13.40	13.40	14.40	------	------	------
Centerville, Iowa	$3.00	3.00	3.00	$3.50	10.00	10.00	15.00	15.00	15.00	8.00	10.00	10.00	25.80	------	------
Grand Rapids, Mich.	2.75	2.75	2.75	6.00	6.00	6.00	6.00	6.00	6.00	8.00	8.00	8.00	24.55	24.55	24.55
Gypsum, Ohio.	3.00	3.00	3.00	4.00	4.00	4.00	6.00	6.00	6.00	8.00	9.00	7.00	30.00	27.00	25.00
Port Clinton, Ohio	3.00	3.00	3.00	4.00	4.00	4.00	6.00	6.00	6.00	10.00	10.00	10.00	30.15	30.15	30.15
Seattle, Wash.	7.00–8.00	6.50	6.50	------	------	11.00	10.00	11.00	11.00	13.00	16.00	15.00–16.00	------	------	------
Winnipeg, Manitoba	5.00	5.00	5.00	5.00	5.00	5.00	7.00	7.00	7.00	13.00	13.00	13.00	------	------	------

[1] Rock products.

RECENT LABORATORY TESTS

During the year the Underwriters' Laboratories made two tests of wall-board partitions 10 feet wide and 11 feet high in a large panel furnace; it had made several tests of panels 6 feet square in a smaller furnace. The available evidence regarding small-scale tests is likely to be useful as a routine check upon the quality of wall boards produced for sale; standard tests of large panels serve as the ultimate basis for opinion regarding the fire-retardant properties of the material.

Fire tests were also made of a partition constructed of wooden studs, wooden lath, and gypsum plaster, and a definite retardant classification is to be given it.

IMPORTS AND EXPORTS

Eight companies in the gypsum industry reported to the Bureau of Mines that they imported gypsum in 1926. They were the Atlantic Gypsum Products Co. (Inc.), Connecticut Adamant Plaster Co., Higginson Manufacturing Co., Newark Plaster Co., Pennsylvania Gypsum Co., Charles W. Priddy & Co. (Inc.), Standard Gypsum Co., and the United States Gypsum Co. Of the gypsum imported (as reported by these companies), about 60,000 tons was sold crude, an increase of 160 per cent compared with 1925; more than 586,000

tons was sold calcined and used mainly in the manufacture of gypsum plasters. The value of the imported gypsum sold crude and in manufactured form by these eight firms in 1926 was about $6,666,500, in comparison with a business of $46,700,000 in domestic gypsum by all producers.

Imports of gypsum and gypsum products, as recorded by the Bureau of Foreign and Domestic Commerce, are given in the tables following:

Gypsum imported for consumption in the United States, 1917–1926

Year	Crude		Ground or calcined		Manufactured plaster of Paris	Keenes cement		Total value
	Short tons	Value	Short tons	Value		Short tons	Value	
1917	240,269	$265,504	16,533	$109,732	$6,016	484	$8,003	$389,255
1918	50,653	55,004	6,117	70,028	1,765	111	2,259	129,056
1919	171,733	211,946	10,415	126,405	7,719	187	5,984	352,054
1920	282,486	397,942	14,921	179,191	10,282	202	5,338	592,753
1921	266,796	364,318	4,495	55,109	33,072	184	6,836	459,335
1922	409,475	523,939	1,774	32,651	55,116	403	9,636	621,342
1923	448,129	629,203	5,133	77,716	41,317	418	11,543	759,779
1924	519,627	724,864	5,217	70,793	48,059	539	12,042	855,758
1925	634,423	915,888	10,759	140,941	56,724	449	11,294	1,124,847
1926	824,081	1,276,131	7,149	99,058	96,355	578	15,701	1,487,245

Gypsum, crude, imported into the United States, 1924–1926, by countries

[General imports]

Country	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Algeria and Tunisia			4	$9	1	$10
Australia	2,576	$2,300				
Canada	516,991	721,604	617,866	879,477	728,941	1,044,810
Cuba			1	5	4,480	7,000
France	28	334	1,092	1,621	12	64
Germany	2	8			(1)	25
Hong Kong	10	165	6	95	8	281
Mexico			14,858	33,360	85,306	217,043
Sweden					2,352	1,959
United Kingdom	20	453	596	1,321	2,981	4,939
	519,627	724,864	634,423	915,888	824,081	1,276,131

[1] Less than ½ ton.

Imports, with the exception of those of ground or calcined gypsum, were larger in 1926 than in 1925. The imports of crude gypsum in 1926 amounted to 824,081 short tons, valued at $1,276,131, of which 728,941 tons, valued at $1,044,810, or 88 per cent in quantity and 82 per cent in value, came from Canada. Mexico was the next largest source of supply, furnishing gypsum rock for an American plant in southern California. Manufactured plaster of Paris imports increased from $56,724 in 1925 to $96,355 in 1926, while imports of Keenes cement increased from 449 tons, valued at $11,294, in 1925 to 578 tons, valued at $15,701, in 1926. Ground or calcined gypsum decreased 3,610 tons and $41,883, the respective figures being 10,759 tons, valued at $140,941, in 1925 and 7,149 tons, valued at $99,058, in 1926.

Exports of gypsum are designated as "gypsum or plaster, crude, ground, calcined, and manufactures of," and have been as follows: 1926, 19,610 short tons, valued at $576,585; 1925, 16,798 tons, $498,616; 1924, 10,623 tons, $358,425; 1923, 8,815 tons, $226,423; 1922, 7,673 tons, $178,166. Exports are not separately classified for earlier years.

CANADA

PRODUCTION

The production of gypsum in Canada, a country that is becoming more important each year as a producer, reached a new high mark in 1926. Larger shipments were reported in all producing Provinces except New Brunswick.

The total shipments for the year amounted to 883,728 short tons, valued at $2,770,813, compared with 740,323 tons, valued at $2,389,891, or an increase of 19 per cent in quantity and 16 per cent in value over 1925.

Gypsum produced and sold in Canada, 1917–1926 [1]

[Figures cover lump, crushed, fine ground, and calcined gypsum]

Year	Short tons	Value	Year	Short tons	Value
1917	336,332	$881,984	1922	559,265	$2,160,898
1918	152,287	823,006	1923	578,301	2,243,100
1919	299,063	1,215,287	1924	646,016	2,208,108
1920	429,144	1,893,991	1925	740,323	2,389,891
1921	386,550	1,785,538	1926	883,728	2,770,813

[1] Dominion Bur. Statistics.

DEPOSITS AND PLANTS

Gypsum is found in all of the Provinces of Canada except Yukon Territory. The deposits of present importance, however, are in Nova Scotia, New Brunswick, Ontário, and to a lesser degree British Columbia and Manitoba.

Nova Scotia, because of its nearness to the northeastern part of the United States and cheap transportation by water, is the most important producer; it contributes about 75 per cent of the total Canadian output, the greater part of which is shipped to the United States. During 1926 Nova Scotia produced about 678,000 tons of gypsum, valued at about $1,188,000.

The following notes on gypsum operations in Canada are offered as of interest to American industry. (Descriptions of gypsum deposits, mines, and mills in the United States will be found in United States Geological Survey Bulletin 697 and Technical Paper 155, United States Bureau of Mines.)

The largest operations in Nova Scotia are those of the Canadian Gypsum Co. at Wentworth, about 2 miles from Windsor, where the company has large holdings of gypsum-bearing land and two quarries, "The Cables" and "Meadow Quarry." Mining is entirely by open-pit methods. The Cables is the chief producer; it is nearly 1,000 feet long, about 500 feet wide, and 80 feet deep. The Meadow Quarry is about 1 mile east of The Cables and is somewhat smaller. The Canadian Gypsum Co. is a branch of the United States Gypsum Co.

Large gypsum quarries at Walton were operated by the Rock Plaster Co. for a number of years. This company was absorbed in 1926 by the Atlantic Gypsum Products Co., of Boston, Mass., which has a large gypsum mill under construction at Portsmouth, N. H.

The quarry of the Windsor Gypsum Co. is only a short distance from the railroad. Quarrying is done by hand. The rock is loaded on flat cars and taken to the shipping point at Windsor, where it is transferred to boats and taken to Newburgh, N. Y. The gypsum from this quarry is high grade and is used chiefly for the manufacture of plaster of Paris for the dental trade, confectioners' molds, statuary, and architectural work.

The Windsor Plaster Co. has two small quarries, one at Clarkesville and the other on the outskirts of Windsor. The rock is taken to the mill at Windsor, where it is manufactured into hard-wall plaster. The company's products are sold throughout the Maritime Provinces, and some have been shipped as far west as Montreal.

Next in importance are the gypsum deposits of Victoria County, Cape Breton Island. The rock from these quarries is calcined by mills in the vicinity, the Iona Gypsum Products (Ltd.) being the most important, and manufactured into finishing, hard-wall, and dental plasters. A good market for these products has been developed in Canada and elsewhere.

At Digby an American gypsum company has inspected and taken an option on several sites of land in the Annapolis Basin, and, according to report, a $100,000 plant is to be constructed during 1927.

Most of the deposits and mills mentioned have the advantage of near-by facilities for shipment by rail or sea and are well equipped to meet the demand for fire-resisting materials brought about by the increased activity of the building trades in both Canada and the United States.

In New Brunswick the chief production of gypsum comes from deposits at Hillsboro, in Albert County, which are described as containing exceptionally pure gypsum. The products made from this gypsum for this reason are reported to be in high favor with the building trades. The Hillsboro gypsum is made into hard-wall plaster, finishing plaster, and dental plasters of different grades. These products are sold in Canada, but a certain quantity also goes to the United States, and markets have been developed in Australia and New Zealand. Only about one-fourth of the gypsum quarried is exported in crude form.

The Ontario Gypsum Co., with plants at Paris, Caledonia, and Lythmore, was the only company in operation in Ontario during 1926. The Alabastine Co., of Paris, Ontario, opened the mine and started the plant in 1905. In 1917 the Alabastine Co. took over the Crown Gypsum Co. and formed the Ontario Gypsum Co., which absorbed the Canada Plaster Board Co. in 1920 and a few years later the Ebsary Gypsum Co. Now the Ontario Gypsum Co. operates the Alabastine Co. at Paris, manufacturing wall tints and similar products; a plaster mill and wall-board mill at Caledonia; and the gypsum mine and plaster mill at Lythmore. The mine production of crude gypsum is estimated at 100,000 tons annually. During the early part of the year the company started construction of a 1-kettle mill and a completely equipped gypsum wall-board plant at Montreal, Quebec. The mill will supply plaster for wall

board only. The crude gypsum used in this plant will come from Nova Scotia.

The Structural Gypsum Co., incorporated in Delaware early in 1926, was granted an Ontario license to manufacture and deal in plaster, cement, limestone, gypsum, and other products.

The gypsum industry in British Columbia was stimulated during the early part of 1926 when the British Columbia Gypsum Co. started operations at New Westminster, British Columbia, employing about 50 men. The plant is estimated to have cost about $200,000 exclusive of the plaster-board plant which will be completed during 1927 and put into operation at once.

MANUFACTURERS AND MINERS, AND THEIR HEAD OFFICES

MANUFACTURERS OF GYPSUM PLASTER

American Gypsum Co., Port Clinton, Ohio.
Arizona Gypsum Plaster Co., Douglas, Ariz.
Atlantic Gypsum Products Co. (Inc.) (importer), 40 Rector Street, New York, N. Y.
Beaver Products Co. (Inc.), Buffalo, N. Y.
Best Bros. Keenes Cement Co., Medicine Lodge, Kans.
Blue Diamond Co., 1650 Alameda Street, Los Angeles, Calif.
Cardiff Gypsum Plaster Co., 903 Central Avenue, Fort Dodge, Iowa.
Certain-teed Products Corporation, 100 East Forty-second Street, New York, N. Y.
Colorado Portland Cement Co., Ideal Building, Denver, Colo.
Connecticut Adamant Plaster Co. (importer), New Haven, Conn.
Dakota Plaster Co., Rapid City, S. Dak.
Ebsary Gypsum Co. (Inc.), Scottsville, N. Y.
Empire Gypsum Co., 319 Cutler Building, Rochester, N. Y.
Federal Gypsum Co., Des Moines, Iowa.
Grand Rapids Plaster Co., 1204 Grand Rapids Savings Bank Building, Grand Rapids, Mich.
Higginson Manufacturing Co. (importer), Newburgh, N. Y.
Jumbo Plaster & Cement Co., Sigurd, Utah.
Lycoming Calcining Co., 120 West Fourth Street, Williamsport, Pa.
Michigan Gypsum Co., Grand Rapids, Mich.
National Gypsum Co., 409 Jackson Building, Buffalo, N. Y.
Nephi Plaster & Manufacturing Co., 907 Continental Bank Building, Salt Lake City, Utah.
Newark Plaster Co. (importer), 30 Church Street, New York, N. Y.
Niagara Gypsum Co., 597 Michigan Street, Buffalo, N. Y.
Northwest Gypsum Products Co., Lewistown, Mont.
Oakfield Gypsum Products Corporation, Oakfield, N. Y.
Overland Cement Plaster Co., Laramie, Wyo.
Pacific Portland Cement Co., Consolidated, Pacific Building, San Francisco, Calif.
Pennsylvania Gypsum Co. (importer), Chester, Pa.
Standard Gypsum Co. (Inc.), 305 Sharon Building, San Francisco, Calif.
Texas Cement Plaster Co., 406 Continental Building, Oklahoma City, Okla.
Three Forks Portland Cement Co., 507 Ideal Building, Denver, Colo.
United States Gypsum Co., 300 West Adams Street, Chicago, Ill.
Universal Gypsum & Lime Co., 1535 Conway Building, Chicago, Ill.
Wasem Plaster Co., Warden Apartments, Fort Dodge, Iowa.

MANUFACTURERS OF GYPSUM PLASTER WHO OPERATE MORE THAN ONE PLANT

Beaver Products Co. (Inc.), Fort Dodge, Iowa; Blue Rapids, Kans.; Grand Rapids, Mich.; Akron, N. Y.; Gypsum, Ohio; Acme, Tex.
Certain-teed Products Corporation, Grand Rapids, Mich.; Acme, N. Mex.; Acme, Okla.; Acme, Tex.; Laramie, Wyo.
Colorado Portland Cement Co., Portland, Colo.; Hanover, Mont.
Grand Rapids Plaster Co., Grand Rapids and Grandville, Mich.

Pacific Portland Cement Co., Consolidated, Plaster City, Calif.; Empire, Nev.
Standard Gypsum Co. (Inc.), Long Beach, Calif.; Ludwig, Nev.; Seattle, Wash.
United States Gypsum Co., Midland, Calif.; Loveland, Colo.; Fort Dodge, Iowa; Blue Rapids, Kans.; Alabaster, Detroit, and Grand Rapids, Mich.; Arden, Nev.; Oakfield, N. Y.; Cleveland and Gypsum, Ohio; Eldorado and Southard, Okla.; Piedmont, S. Dak.; Sweetwater, Tex.; Plasterco, Va.
Universal Gypsum & Lime Co., Fort Dodge, Iowa; Akron, N. Y.; Rotan, Tex.

MANUFACTURERS OF KEENES CEMENT

Best Bros. Keenes Cement Co., Medicine Lodge, Kans.
Certain-teed Products Corporation, 100 East Forty-second Street, New York. N. Y.
Nephi Plaster & Manufacturing Co., 907 Continental Bank Building, Salt Lake City, Utah.
United States Gypsum Co., 300 West Adams Street, Chicago, Ill.

MANUFACTURERS OF GYPSUM PLASTER BOARD AND WALL BOARD

American Gypsum Co., Port Clinton, Ohio.
Atlantic Gypsum Products Co. (Inc.), 40 Rector Street, New York, N. Y.
Beaver Products Co. (Inc.), Buffalo, N. Y.
Bell, W. H., Co., 2582 Park Avenue, New York, N. Y.
Buttonlath Manufacturing Co., Vernon and Boyle Avenues, Los Angeles, Calif.
Duffy, J. P., Co., Fifty-first Street and Second Avenue, Brooklyn, N. Y.
Gypsite Fireproofing Co., 2034 Dime Bank Building, Detroit, Mich.
Hercules Plaster Board Co., Hampton, Va.
Kelley Plaster & Plaster Board Co., 261 Central Avenue, Passaic, N. J.
Key-Hold Lath Co., 148 Hooper Street, San Francisco, Calif.
National Gypsum Co., 409 Jackson Building, Buffalo, N. Y.
New Jersey Adamant Manufacturing Co., 79 Passaic Avenue, East Newark, N. J.
Niagara Gypsum Co., 597 Michigan Street, Buffalo, N. Y.
Rader, Gustav, Co., 1105 Metropolitan Avenue, Brooklyn, N. Y.
Reeb, M. A., Corporation, 597 Michigan Street, Buffalo, N. Y.
Rockwood Corporation, St. Louis, Mo.
Schumacher Wall Board Co., 5802 South San Pedro Avenue, Los Angeles, Calif.
Texas Cement Plaster Co., 406 Continental Building, Oklahoma City, Okla.
United States Gypsum Co., 300 West Adams Street, Chicago, Ill.
Universal Gypsum & Lime Co., 1535 Conway Building, Chicago, Ill.

MANUFACTURERS OF GYPSUM BLOCK AND TILE

American Gypsum Co., Port Clinton, Ohio.
Arizona Gypsum Plaster Co., Douglas, Ariz.
Beaver Products Co. (Inc.), Buffalo, N. Y.
Certain-teed Products Corporation, 100 East Forty-second Street, New York, N. Y.
Dakota Plaster Co., Rapid City, S. Dak.
Ebsary Gypsum Co. (Inc.), Scottsville, N. Y.
Federal Gypsum Co., Des Moines, Iowa.
Niagara Gypsum Co., 597 Michigan Street, Buffalo, N. Y.
Northwest Gypsum Products Co., Lewistown, Mont.
Pacific Portland Cement Co., Consolidated, Pacific Building, San Francisco, Calif.
Texas Cement Plaster Co., 406 Continental Building, Oklahoma City, Okla.
United States Gypsum Co., 300 West Adams Street, Chicago, Ill.
Universal Gypsum & Lime Co., 1535 Conway Building, Chicago, Ill.
Wasem Plaster Co., Warden Apartments, Fort Dodge, Iowa.

MINERS

[Selling only uncalcined gypsum]

Atlas Gypsum Corporation, Clarence, N. Y.
Hawkeye Gypsum Products Co., Fort Dodge, Iowa.
Oklahoma Portland Cement Co., 507 Ideal Building, Denver, Colo.
Phoenix Gypsum Co. (Inc.), Basom, N. Y.
Regan Bros., Mason, Nev.

CLAY

By Jefferson Middleton

GENERAL CONDITIONS

Clay available for the manufacture of clay products, the largest use, is widely distributed throughout the United States, and there are clay-working plants in every State. The tables of production that follow represent chiefly the clay that was mined and sold as clay, or mined under royalty or shipped into another State for fabrication, and do not include the clay that was burned into clay products by the producers themselves, unless it was mined under royalty or in a different State from that in which it was used. The quantity of clay thus sold is small compared with the total output and mainly includes clay used for making high-grade pottery and tile, paper, and refractory products. The values given for domestic production are f. o. b. mines or works; for imports, at the principal markets of the countries from which the clay was exported; for exports, at the port of shipment.

The domestic clay-mining industry continues to grow in importance notwithstanding a small decrease—less than 2 per cent—in the total quantity of clay sold in 1926, compared with 1925. The production of 1926 was larger than that of any year prior to 1925 and was 35 per cent greater than that of 10 years ago (1916). The decrease in the quantity of clay sold in 1926 occurred in the low-grade clays used chiefly for brickmaking and did not affect the higher grades of clay, sales of every one of which increased in quantity and value in 1926 as compared with 1925. Three of the higher grade clays, namely, kaolin, ball clay, and fire clay, reached their maximum quantity and value in 1926. The total value of the clay sold in 1926 was the largest ever recorded; it was 11 per cent more than that of 1925 and 145 per cent more than that of 1916. The increasing sales of domestic clays for uses, such as in the higher grades of ceramic products, in the paper industry for coating and filling, and for other fillers, which are largely supplied by foreign material, indicate the growing use of domestic clays in these industries in spite of the adverse freight rates on the southern clay to northern markets, and lead to the hope that possibly domestic manufacturers of these commodities may become independent of foreign supplies. In 1926 the domestic mines supplied more than half of the new supply of kaolin in the United States. In the manufacture of refractories independence of foreign clays has been nearly attained.

The sales of domestic kaolin, the chief clay used for high-grade wares, increased 18 per cent, whereas the imports of kaolin, or china clay, increased but 6 per cent. The Southern States are the chief source of supply of kaolin, producing more than 80 per cent of the total. Georgia is the largest producer, reporting 41 per cent of the total sales for 1926.

Ball clay, which is principally used with kaolin in the bodies of high-grade ceramics, increased 2 per cent in quantity and 24 per cent in value as compared with 1925. The quantity and value reported for 1926 were the largest ever recorded.

Slip clay, a low-fusing material that formerly was used chiefly as a glaze on stoneware, now finds its main use as a binder in the manufacture of artificial abrasives. In 1926 the quantity of slip clay sold increased 18 per cent and the value increased 23 per cent as compared with 1925. The sources of supply of slip clay in 1926 were Michigan and New York.

Stoneware clay, the principal use of which is indicated by its name, increased 8 per cent in quantity and 14 per cent in value as compared with 1925. The term "stoneware clay" is used rather loosely, and much, if not all, of the fire and miscellaneous clays reported as having been sold for the manufacture of stoneware might properly be classed as stoneware clay.

Fire clay, which constituted more than two-thirds of the total quantity of clay sold by producers in 1926, again made a record-breaking output, exceeding the war-time record of 1917 by 471,374 tons, or 20 per cent. The increase in 1926 over 1925 was 10 per cent in quantity and 11 per cent in value. The chief use of this clay, as its name indicates, is in the refractory industries. Considerable quantities are also used in the sanitary ware, stoneware, terra cotta, cement, plaster, and other industries.

Miscellaneous clays embrace those used in many industries; the larger part of the output is used in the manufacture of heavy clay products, such as building and drainage materials. Clay included under this head is also used for cosmetics, filtering oil (after treatment), flowerpots, insecticides, modeling, soap filler, softening water, taxidermy, and other purposes.

PRODUCTION

Clay sold by producers in the United States, 1917–1926, by kinds

Year	Kaolin or china clay and paper clay		Ball clay		Slip clay		Fire clay	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	206,334	$1,263,799	107,406	$569,240	16,972	$70,505	2,347,972	$5,625,095
1918	179,694	1,459,529	89,896	590,631	13,552	49,898	2,305,033	5,664,064
1919	152,828	1,475,681	65,026	520,849	5,149	17,556	1,755,331	4,628,605
1920	268,203	2,865,407	69,477	584,611	9,006	41,519	2,261,915	7,088,049
1921	162,726	1,579,163	54,014	354,565	4,608	14,841	1,195,861	3,560,373
1922	275,675	2,346,095	76,792	440,877	4,050	19,405	1,679,220	4,633,486
1923	336,803	2,926,255	97,068	620,978	8,520	43,609	2,298,163	6,565,899
1924	326,611	2,923,965	83,034	581,966	5,910	31,023	2,443,710	6,737,063
1925	367,319	3,220,719	109,607	699,427	7,349	37,397	2,566,934	7,312,349
1926	432,215	3,771,568	112,195	867,500	8,644	45,959	2,819,346	8,119,323

Year	Stoneware clay		Brick clay		Miscellaneous clay		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	81,352	$113,839	93,779	$94,703	260,029	$305,365	3,113,844	$8,042,546
1918	86,800	147,098	(1)	(1)	301,386	421,421	2,976,361	8,332,641
1919	60,236	80,367	(1)	(1)	236,530	367,573	2,275,100	7,090,631
1920	106,350	229,221	(1)	(1)	322,100	467,856	3,037,051	11,276,663
1921	86,574	184,540	(1)	(1)	242,963	361,818	1,746,746	6,055,300
1922	86,866	164,870	(1)	(1)	525,097	725,781	2,647,700	8,330,514
1923	81,389	194,358	(1)	(1)	612,717	837,814	3,434,660	11,188,913
1924	59,194	117,142	(1)	(1)	772,660	1,116,377	3,691,119	11,507,536
1925	77,438	162,161	(1)	(1)	901,773	1,304,579	4,030,420	12,736,632
1926	84,002	185,288	(1)	(1)	510,796	1,115,951	3,967,198	14,105,589

[1] Included under "Miscellaneous clay."

Clay sold by producers in the United States in 1925, by States and kinds

State	Number of operators reporting sales	Kaolin or china clay and paper clay		Ball clay		Fire clay		Stoneware clay		Miscellaneous clay [1]		Total	
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	14					80,968	$143,622	74	$110	26,298	$25,579	107,340	$169,311
Arizona	(2)									(2)	(2)	(2)	(2)
Arkansas	4					(2)	(2)			(2)	(2)	623	2,634
California	31	2,735	$22,175	(2)	(2)	160,931	345,316	(2)	(2)	123,896	327,826	293,794	707,908
Colorado	18					187,266	279,046	558	1,395	66,697	78,246	254,521	358,687
Connecticut	3					(2)	(2)			(2)	(2)	416	6,503
Delaware	3	3,896	61,362			1,221	2,442			466	1,901	5,583	65,705
Florida	4	53,009	711,567									53,009	711,567
Georgia	17	141,956	1,040,064			26,413	52,568	(2)	(2)	(2)	(2)	330,063	1,255,166
Idaho	(2)					214	2,085					214	2,085
Illinois	19			(2)	(2)	132,274	255,605	34,955	48,757	(2)	(2)	218,264	384,199
Indiana	15					141,634	182,710			46,857	22,252	188,491	204,962
Iowa	3					(2)	(2)			(2)	(2)	2,813	3,539
Kentucky	19			31,453	$222,562	90,464	325,453					121,917	548,015
Maine	(2)					(2)	(2)			(2)	(2)	(2)	(2)
Maryland	14	(2)	(2)			29,102	103,116			(2)	(2)	91,032	168,696
Massachusetts	8					959	28,557			1,311	2,981	2,270	31,538
Michigan	4									3,953	7,405	3,953	7,405
Minnesota	(2)									(2)	(2)	(2)	(2)
Mississippi	3					(2)	(2)			(2)	(2)	2,229	11,090
Missouri	32	(2)	(2)	(2)	(2)	[3] 447,062	[3] 1,442,456	(2)	(2)	(2)	(2)	453,006	1,463,880
Montana	5					4,895	19,668			8,631	8,631	13,526	28,299
Nebraska	3					(2)	(2)			(2)	(2)	29,169	30,589
Nevada	3	(2)	(2)							(2)	(2)	1,719	17,095
New Jersey	44			5,155	30,096	269,660	1,233,502	15,865	69,817	52,523	85,564	343,203	1,418,979
New Mexico	4					4,753	12,657					4,753	12,657
New York	7					(2)	(2)			(2)	(2)	7,503	47,637
North Carolina	6	18,799	309,833					(2)	(2)	(2)	(2)	18,983	310,683
North Dakota	(2)	2	26			27	286					29	312
Ohio	59					265,857	721,794	13,798	18,765	29,454	20,929	309,109	761,488
Oregon	(2)					(2)	(2)	(2)	(2)			(2)	(2)
Pennsylvania	93	66,539	342,385			602,159	1,740,326	1,787	5,057	88,860	130,890	739,345	2,218,658
South Carolina	9	52,937	541,222			(2)	(2)	(2)	(2)			55,725	634,278
South Dakota	3									1,045	9,680	1,045	9,680
Tennessee	15			66,785	407,504	28,167	93,620			115,189	117,068	210,141	618,192

[1] Includes ardmorite, bentonite, black-burning clay, halloysite, montmorillonite, and shale; clay for architectural terra cotta, asbestos products, blast furnaces, brick (building and paving), cement, fire brick and block, fire-clay mortar, fireworks, foundries, gas retorts, glasshouse pots, hollow building tile, modeling, paint and paper filler, pencil leads, plaster and plaster products, pottery, saggers, smelters, taxidermy, tile (high-grade and drain), water softener, and zinc retorts. Slip clay is also included in this column as a matter of statistical convenience.

[2] Included under "Undistributed."

Clay sold by producers in the United States in 1925, by States and kinds—Continued

State	Number of operators reporting sales	Kaolin or china clay and paper clay		Ball clay		Fire clay		Stoneware clay		Miscellaneous clay		Total	
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Texas	11					3,307	$16,691	(2)	(2)	(2)	(2)	4,821	$20,247
Utah	8					7,330	19,151			7,881	$47,831	15,211	66,982
Vermont	(2)	1,733	$9,444									1,733	9,444
Virginia	4	(2)	(2)			1,130	4,291			(2)	(2)	20,963	163,857
Washington	7					3,576	19,418			20,594	24,227	24,170	43,645
West Virginia	5					68,853	135,751					68,853	135,751
Wisconsin	3									390	904	390	904
Wyoming	4					(2)	(2)			(2)	(2)	2,584	63,657
Undistributed	12	25,713	182,641	6,214	$39,265	8,712	132,218	10,401	$18,260	315,077	430,062	7,907	20,198
	516	367,319	3,220,719	109,607	699,427	[3] 2,566,934	[3] 7,312,349	77,438	162,161	[4] 909,122	[4] 1,341,976	4,030,420	12,736,632
Average value per ton			8.77		6.38		2.85		2.09				3.16

[2] Included under "Undistributed."
[3] These totals include 15,177 tons of diaspore clay from Missouri, valued at $102,064.
[4] These totals include 7,349 tons of slip clay, valued at $37,397, or $5.09 per ton, from Michigan, New York, and Tennessee (of this New York reported 6,830 tons, valued at $34,943).

Clay sold by producers in the United States in 1926, by States and kinds

State	Number of operators reporting sales	Kaolin or china clay and paper clay		Ball clay		Fire clay		Stoneware clay		Miscellaneous clay [1]		Total	
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	13					96,490	$150,101	35	$53	13,482	$21,270	110,007	$171,424
Arizona	(2)									(2)	(2)	(2)	(2)
Arkansas	(2)					442	2,106					442	2,106
California	38	(2)	(2)	(2)	(2)	161,898	424,920	4,312	7,212	125,748	345,343	297,329	804,978
Colorado	17					172,158	221,393	1,222	3,055	26,487	30,075	199,867	254,523
Connecticut	3					435	7,591			359	1,900	794	9,491
Delaware	3	5,115	$80,868			1,604	6,416			518	2,158	7,237	89,442
Florida	4	56,344	772,124									56,344	772,124
Georgia	16	175,230	1,357,923			(2)	(2)	(2)	(2)			205,801	1,398,061
Idaho	(2)					569	5,787					569	5,787
Illinois	19			(2)	(2)	171,036	343,564	26,698	42,347	(2)	(2)	205,926	410,476

Indiana	15	(2)	(2)			168,263	200,463	(2)	(2)	34,820	20,934	206,233	237,497
Iowa	3					(2)	(2)			(2)	(2)	1,717	13,707
Kentucky	17			52,784	$421,253	75,801	285,523					128,585	706,776
Maine	(2)					(2)	(2)			(2)	(2)	(2)	(2)
Maryland	13	7,000	10,500			22,263	83,295			32,063	37,123	61,326	130,918
Massachusetts	7					675	25,733			1,275	3,240	1,950	28,973
Michigan	5									4,287	9,349	4,287	9,349
Minnesota	3									11,850	26,719	11,850	26,719
Mississippi	3					3,433	32,308	(2)	(2)	(2)	(2)	4,873	34,958
Missouri	34			2,880	21,920	452,449	1,539,271	3,000	4,500	2,417	5,335	460,746	1,571,026
Montana	3					7,552	12,985			7,434	4,260	14,986	17,245
Nebraska	3					350	1,975			35,013	35,285	35,363	37,260
Nevada	5	764	7,019							11,254	71,808	12,018	78,827
New Jersey	44			5,919	39,862	292,155	1,296,759	16,506	74,617	28,006	52,050	342,586	1,463,288
New Mexico	5					2,118	10,517					2,118	10,517
New York	7					(2)	(2)			(2)	(2)	13,688	98,616
North Carolina	6	20,719	331,487					50	75			20,769	331,562
North Dakota	(2)					(2)	(2)					(2)	(2)
Ohio	60					302,868	779,842	28,628	43,697	7,118	26,721	338,614	850,260
Oregon	(2)					473	1,009					473	1,009
Pennsylvania	91	72,784	346,894			717,086	2,121,474	1,630	4,599	64,332	90,407	855,832	2,563,374
South Carolina	9	60,404	592,262			1,769	68,180					62,173	660,442
South Dakota	3									1,810	17,800	1,810	17,800
Tennessee	15			44,248	348,761	63,691	226,258			65,574	77,210	173,513	652,229
Texas	9					(2)	(2)			(2)	(2)	2,682	16,754
Utah	7					2,949	16,121			5,203	91,842	8,152	107,963
Vermont	(2)	2,027	11,364									2,027	11,364
Virginia	3	(2)	(2)			576	2,376			(2)	(2)	29,945	243,197
Washington	8					1,500	15,381	756	2,268	10,691	13,866	12,947	31,515
West Virginia	6					63,416	113,007					63,446	113,007
Wisconsin	(2)									220	220	220	220
Wyoming	3									4,409	96,853	4,409	96,853
Undistributed	14	31,828	261,127	6,364	35,704	35,297	124,968	1,165	2,865	25,070	80,142	3,544	23,952
	514	432,215	3,771,568	112,195	867,500	[3] 2,819,346	[3] 8,119,323	84,002	185,288	[4] 519,440	[4] 1,161,910	3,967,198	14,105,589
Average value per ton			8.73		7.73		2.88		2.21				3.56

[1] Includes adobe, ardmorite, bentonite, black-burning clay, montmorillonite, and shale; clay for architectural terra cotta, art pottery, asbestos products, binder, blast furnaces, brick (building and paving), cosmetics, filtering or decolorizing oils, fire brick and block, fire-clay mortar, flowerpots, flue lining, foundries, hollow building tile, modeling, paint, paper, plaster, sewer pipe, shoe and stove polish, soap, taxidermy, high-grade tile, and water softener. Slip clay is also included in this column as a matter of statistical convenience.

[2] Included under "Undistributed."

[3] These totals include 18,483 tons of diaspore clay from Missouri, valued at $100,823.

[4] These totals include 8,644 tons of slip clay, valued at $45,959, or $5.32 per ton, from Michigan (556 tons, valued at $3,422) and New York (8,088 tons, valued at $42,537).

In 1926, as in 1925, operators in 43 States sold clay as such. The leading 10 States in order of quantity of clay sold in 1926 were Pennsylvania (21.6 per cent of the total of the United States), Missouri (11.6 per cent), New Jersey (8.6 per cent), Ohio (8.5 per cent), California (7.5 per cent), Indiana (5.2 per cent), Illinois (5.2 per cent), Georgia (5.2 per cent), Colorado (5 per cent), and Tennessee (4.4 per cent). The first three States maintained the ranks they held in 1925. Changes in the other States in 1926 were: Georgia fell from fourth to eighth, Colorado from seventh to ninth, and Tennessee from ninth to tenth; Ohio rose from fifth to fourth, California from sixth to fifth, Illinois from eighth to seventh, and Indiana from tenth to sixth. These 10 States reported 82.8 per cent of the total in 1926, and the first 5 of them reported 57.8 per cent. In all of these States, except Georgia and Tennessee, fire clay is the leading kind reported and constituted from 54 per cent of the State total in California to 98 per cent in Missouri. Of the 43 States in which clay was sold in 1926, 28 reported increase in quantity and 32 reported increase in total value compared with 1925.

PRODUCTION BY USES

Statistics showing the production of clay by uses are necessarily incomplete, as many clay miners do not know the purpose to which their clay is put, but it is believed that the figures given in the following table are sufficiently complete to serve as a guide in the study of the uses of domestic clays. In considering these figures it should be borne in mind that they represent chiefly the clay sold as clay by the original producers and do not include the much greater quantities of clay that are burned into clay products by those who mine their own clay.

Clay sold by producers in the United States in 1926, by uses, in short tons

Use	Kaolin or china clay and paper clay	Ball clay	Slip clay	Fire clay (including fire-clay dust and clay for fire-clay mortar)	Stoneware clay	Miscellaneous clay	Total
White-bodied ware made from white-burning clays, including china, porcelain, general ware, chemical porcelain, porcelain electrical supplies, sanitary ware, etc	69,655	55,509	-------	15,261	-------	-------	140,425
Art pottery	1,028	5,210	-------	2,588	-------	183	9,009
High-grade tile	23,862	33,297	-------	7,822	1,200	2,868	69,049
Chemical stoneware	1,567	90	-------	1,269	6,474	-------	9,400
Stoneware	479	84	-------	11,828	54,585	-------	66,976
Enameling, as coating for granite ware, etc	4	734	-------	-------	-------	-------	738
Paper filler	156,897	60	-------	500	-------	1,102	158,559
Paper coating	3,543	-------	-------	800	-------	-------	4,343
Rubber	25,190	-------	-------	-------	-------	-------	25,190
Oilcloth or linoleum	9,256	-------	-------	-------	-------	-------	9,256
Paint filler or extender	13,762	-------	-------	-------	-------	70	13,832
Paint pigment	16	-------	-------	-------	-------	-------	16
Architectural terra cotta	200	93	-------	69,157	20,220	5,875	95,545
Asbestos products	1,353	616	-------	2,297	-------	1,619	5,885
Plaster and plaster products	7,721	-------	-------	11,613	-------	4,726	24,060
Slip for glazing purposes	-------	-------	2,781	-------	-------	-------	2,781
Cement	57,116	-------	-------	5,327	-------	-------	62,443
Kalsomine	2,545	-------	-------	847	-------	-------	3,392
Artificial abrasives	7	81	5,863	5,055	1,149	-------	12,155

Clay sold by producers in the United States in 1926, by uses, in short tons—Con.

Use	Kaolin or china clay and paper clay	Ball clay	Slip clay	Fire clay (including fire-clay dust and clay for fire-clay mortar)	Stoneware clay	Miscellaneous clay	Total
Crayons (for tailors' use, etc.)	408						408
Chemicals	3,033						3,033
Saggers	6,994	14,794		174,395	224		196,407
Pins, stilts, and spurs for potters' use	400	151		8,080			8,631
Wads				35,160			35,160
Gas retorts				4,097			4,097
Fire brick and block	32,168			782,760		10,067	824,995
Fire-clay mortar, including clay processed for laying fire brick	2,457	640		542,580		2,229	547,906
Bauxite and high alumina brick				2,500			2,500
Glasshouse pots	150	118		24,889			25,157
Glasshouse supplies, blocks, tiles, etc				1,799			1,799
Zinc retorts and condensers				56,335			56,335
Clay crucibles	100			2,039			2,139
Graphite crucibles and stoppers		269		1,292			1,561
Foundry use and steel works for cupola lining, etc	73			479,360		44,227	523,660
Unspecified [1]	12,231	449		569,696	150	437,830	1,020,356
	432,215	112,195	8,644	2,819,346	84,002	510,796	3,967,198

[1] Includes clay for brick (building and paving), chimney blocks, copper converters, cosmetics, decolorizing oil, flowerpots, flue lining, furnaces, fuses, hollow building tile, modeling, retorts, sewer pipe, shoe and stove polish, soap products, taxidermy, toy marbles, wall paper, and water softener; also black-burning clay.

IMPORTS AND EXPORTS [1]

Clay imported for consumption in the United States, 1917–1926

Year	Kaolin or china clay			Common blue and Gross Almerode glass-pot clay		All other clays				Total	
						Unwrought		Wrought			
	Short tons	Value		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
		Total	Average								
1917	241,029	$1,315,769	$5.46	88	$709	26,581	$123,439	338	$2,142	268,036	$1,442,059
1918	168,100	1,153,240	6.86	114	983	26,984	163,484	137	1,087	195,335	1,318,794
1919	180,592	1,965,393	10.88	4	133	23,759	187,550	498	4,282	204,853	2,157,338
1920	361,800	3,568,677	9.86	6,837	157,201	34,252	272,524	691	10,267	403,580	4,008,669
1921	162,906	1,546,285	9.49	4,468	77,217	41,421	348,870	120	2,313	208,915	1,974,685
1922	310,136	2,963,420	9.56	7,323	84,415	40,624	327,388	2,566	29,398	360,649	3,404,621
1923	311,298	3,046,191	9.79	12,999	121,272	65,379	481,614	1,676	21,892	391,352	3,670,969
1924	353,124	3,188,454	9.03	7,059	62,883	82,562	706,018	1,322	18,685	444,067	3,976,040
1925	372,552	3,195,694	8.58	11,889	107,940	49,991	499,325	2,383	29,266	436,815	3,832,225
1926	396,219	3,484,054	8.79	6,608	60,391	84,512	672,223	2,331	31,243	489,670	4,247,911

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Domestic clay exported from the United States, 1917–1926

Year	Fire clay		All other		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	54,023	$268,093	29,194	$178,764	83,217	$446,857
1918	60,206	333,880	24,348	192,053	84,554	525,933
1919	37,486	262,501	30,983	249,571	68,469	512,072
1920	54,125	393,177	66,035	775,222	120,160	1,168,399
1921	23,666	177,979	23,779	183,449	47,445	361,428
1922	24,391	169,664	[1] 23,285	[1] 267,908	47,676	437,572
1923	50,055	303,675	34,840	329,192	84,895	632,867
1924	41,704	312,676	31,051	420,040	72,755	732,716
1925	44,037	350,571	39,006	530,995	83,043	881,566
1926	47,737	348,302	42,157	644,416	89,894	992,718

[1] Includes 2,091 short tons of "kaolin, china, and paper clay," valued at $27,840. Similar exports are not separately classified for other years.

Imports of clay increased 12 per cent in quantity and 11 per cent in value in 1926 as compared with 1925. Imports of kaolin, or china clay, which constituted 81 per cent of the total imports, and came chiefly from England, increased 23,667 tons, or 6 per cent, in 1926; the value increased $288,360, or 9 per cent, as compared with 1925. The imports were the largest ever recorded, a surprising fact in view of the coal strike in England, which curtailed production of kaolin. The average value per ton of the imported kaolin increased 21 cents compared with 1925. The imports of high-grade refractory clay, imported under common blue and Gross Almerode glass-pot clay, decreased 44 per cent in both quantity and value, compared with 1925, and the quantity imported was the smallest since 1921. Imports under unwrought clays, which are thought to include ball clay, increased 69 per cent in quantity over 1925, and reached the maximum quantity.

In 1926 exports of domestic clay increased 8 per cent in quantity and 13 per cent in value compared with 1925. Fire clay, which constituted 53 per cent of the total quantity of clay exported and 35 per cent of its value, increased 8 per cent in quantity but decreased slightly—less than 1 per cent—in value compared with 1925. The exports of clay in 1926 compared with 1920, the year of greatest quantity and value, decreased 25 per cent in quantity and 15 per cent in value.

NATURAL-GAS GASOLINE

By G. R. Hopkins [1]

Production of raw natural-gas gasoline in the United States in 1926 amounted to 1,363,090,000 gallons, an increase of 235,620,000 gallons, or 21 per cent, over the output in 1925. The increase in 1925 was also 21 per cent, and the average annual increase since 1911 has been 45 per cent. The preliminary figure for the total production in 1926 as reported in the monthly statistical statement issued February 23, 1927, and shown on page 167 of this report, was 1,356,800,000 gallons; the small difference is due to the fact that the annual canvass reaches a few small plants not covered by the monthly inquiries.

All the producing States reported gains in output over 1925. Oklahoma led the producing States, followed by California and Texas. These three States produced 81 per cent of the total output in 1926. In general, the increased production in most of the States was due to the larger amount of gas treated; however, Illinois, Kentucky, and Louisiana used less gas in 1926, but were able to increase their output of gasoline through greater efficiency of recovery.

For the first time the data received for production by counties were complete enough for publication. By far the most important producing county in the country in 1926 was Los Angeles County, Calif., which had an output of nearly 230,000,000 gallons. Other large producing counties were Osage, Creek, and Seminole Counties, Okla.; Kern County, Calif.; and Stephens and Eastland Counties, Tex. Seminole County, Okla., produced 70,661,000 gallons in 1926, as compared with about 42,000,000 gallons in 1925. This large gain resulted from the building of new plants in the greater Seminole oil field during the last half of the year. Because of its record-breaking output of crude oil in 1927, this county should lead the other counties of the State in production of natural-gas gasoline that year.

Of the total output in 1926, 1,024,800,000 gallons, or 75 per cent, was reported as blended at refineries; 154,100,000 gallons, or 11 per cent, was turned into pipe lines and run to stills; 28,800,000 gallons, or 2 per cent, was blended at the plants; about 10,000,000 gallons was blended by jobbers; 4,000,000 gallons was added to storage; leaving 141,390,000 gallons, or 10 per cent, for losses and quantities not accounted for.

[1] Figures compiled by E. M. Seeley, of the Bureau of Mines.

As stated above, 75 per cent of the total output of raw natural-gas gasoline was blended at refineries, and 11 per cent was run to refinery stills by pipe line, making a total of 86 per cent used directly or indirectly by refineries. An increase in the number of refineries using natural-gas gasoline was noted in 1926, but this gain was counterbalanced by some of the larger users recording a decrease in the amount blended. The explanation advanced for the decrease was that the larger companies, who are also the leading users of cracking equipment, have been able to reduce their requirements for natural-gas gasoline by operating their cracking equipment so as to obtain a high percentage of volatile fractions and by producing their own "absorption gasoline" from their vapor-recovery systems. The producing companies without long-term contracts inevitably had some of the so-called "distress" product on their hands, which indirectly found its way to the small refiner but at a concession in price.

The quantity of natural-gas gasoline transported to the refineries by means of pipe lines was 154,100,000 gallons in 1926, a material gain over 1925. The major part of this amount was handled by pipe lines in California. Transportation by pipe line, long nearly dormant because of the high losses incurred, will undoubtedly become increasingly important through the more general use of welded pipe lines and vapor-tight equipment.

Blending at the plants showed only a small increase over 1925, remaining relatively unimportant. According to the monthly inquiries, 28,800,000 gallons of raw natural-gas gasoline was blended at the plants with 42,600,000 gallons of naphtha, or at the ratio of 1 to 1.5. Relatively small amounts of natural-gas gasoline were sold direct to jobbers for blending. Complete data on this phase of the industry are lacking, but the total involved is estimated at only 10,000,000 gallons.

A complete record of losses of natural-gas gasoline is impossible to obtain; hence losses are usually considered as the difference between production and the best figures on consumption that are available. Losses in 1926 were approximately 10 per cent of the total output. Much progress was made in 1926 in reducing the percentage of losses; this was accomplished through more efficient methods of storing and handling, by producing a more stable product, and through the use of improved tank cars.

The trend toward mergers and consolidations in the natural-gas gasoline industry was marked in 1926. The number of operators fell from 450 to 390, whereas the number of plants showed a slight gain. Decreased profits and failing gas supplies were the chief causes that impelled many of the smaller operators to sell out to the larger companies.

The number of plants using the straight compression process decreased by 80, which was approximately the increase in the number of plants using the absorption process. The number of charcoal plants increased from 16 to 30. Although the number of compression plants declined, the total production from plants of this type showed a slight gain over 1925.

The yield of natural-gas gasoline per thousand cubic feet of gas treated for the country as a whole was 1.1 gallons in 1926, or virtually the same as in 1925. Some of the smaller producing States reported increases or decreases in yield, but little change was recorded in the larger producing States.

The value at the plants of the total output in 1926 was $136,412,000, or an average of 10 cents per gallon. This compares with an average of 10.7 cents in 1925. Although the spot price of Oklahoma natural-gas gasoline, grade A, was higher at the beginning of 1926 than in 1925, it soon fell behind, for instead of rising coincidently with the increase in motor-fuel consumption it actually declined. This somewhat common experience in the petroleum industry—that is, falling prices in the face of rising demand—was due, as usual, to overproduction.

Natural-gas gasoline produced in the United States, 1925–26, by States

State	Number of operators reporting [1]	Number of plants	Raw (unblended) gasoline produced			Estimated quantity of natural gas treated	
			Thousands of gallons	Value at plant		Millions of cubic feet	Average yield per M cubic feet (gallons)
				Thousands of dollars	Average per gallon (cents)		
1925							
Alaska	1	1	33	5	15.2	21	1.6
Arkansas	6	9	19,686	2,420	12.3	4,892	4.0
California	61	145	303,180	32,743	10.8	236,697	1.3
Colorado	1	1	35	4	11.4	15	2.3
Illinois	30	86	9,874	1,102	11.2	3,856	2.6
Kansas	10	15	19,592	2,223	11.3	27,648	.7
Kentucky	9	10	7,685	884	11.5	28,231	.3
Louisiana	31	44	43,489	4,216	9.7	113,873	.4
New York	5	5	414	46	11.1	320	1.3
Ohio	22	41	8,701	990	11.4	34,392	.3
Oklahoma	107	288	390,861	40,973	10.5	196,223	2.0
Pennsylvania	115	167	18,850	2,185	11.6	59,686	.3
Texas	51	117	214,092	22,606	10.6	149,525	1.4
West Virginia	47	141	58,201	6,759	11.6	150,626	.4
Wyoming	8	11	32,777	3,227	9.8	34,385	1.0
	[1] 450	1,081	1,127,470	120,383	10.7	1,040,390	1.1
1926							
Alaska	1	1	33	4	12.1	25	1.3
Arkansas	10	16	30,385	2,867	9.4	20,903	1.5
California	65	172	389,366	[2] 45,945	11.8	284,365	1.4
Colorado	1	3	276	17	6.2	390	.7
Illinois	26	82	9,987	967	9.7	3,674	2.7
Kansas	14	21	25,369	2,105	8.3	30,801	.8
Kentucky	10	12	7,689	914	11.9	26,521	.3
Louisiana	26	44	43,557	3,692	8.5	111,537	.4
New Mexico	1	1	1,488	146	9.8	884	1.7
New York	4	4	539	66	12.2	500	1.1
Ohio	21	40	10,817	1,402	13.0	45,533	.2
Oklahoma	94	297	475,716	41,433	8.7	235,157	2.0
Pennsylvania	90	141	20,343	2,454	12.1	63,819	.3
Texas	50	134	243,093	22,760	9.4	181,243	1.3
West Virginia	44	123	63,807	7,706	12.1	166,135	.4
Wyoming	8	11	40,625	3,934	9.7	34,813	1.2
	[1] 390	1,102	1,363,090	136,412	10.0	1,206,300	1.1

[1] A producer operating in more than one State is counted only once. [2] Estimated.

Natural-gas gasoline produced in the United States, 1925–26, by States and by methods of manufacture

State	Number of plants			Raw (unblended) gasoline produced (thousands of gallons)		
	Compression	Absorption including combination absorption process with compression and charcoal processes	Charcoal	Compression	Absorption including combination absorption process with compression and charcoal processes	Charcoal
1925						
Alaska		1			33	
Arkansas		9			19,686	
California	9	136		6,718	296,462	
Colorado	1			35		
Illinois	86			9,874		
Kansas	3	12		553	19,039	
Kentucky	2	5	3	632	6,052	1,001
Louisiana	13	29	2	7,802	[1] 35,687	(1)
New York	4	1		304	110	
Ohio	25	15	1	838	[1] 7,863	(1)
Oklahoma	156	130	2	114,520	275,539	802
Pennsylvania	143	20	4	7,706	9,066	2,078
Texas	42	75		56,067	158,025	
West Virginia	83	54	4	11,168	44,438	2,595
Wyoming	6	5		21,995	10,782	
	573	492	16	238,212	881,681	7,577
1926						
Alaska		1			33	
Arkansas	2	13	1	(2)	[2] 29,426	959
California	6	161	5	5,801	381,769	1,796
Colorado	1	2		16	260	
Illinois	82			9,987		
Kansas	6	15		4,807	20,562	
Kentucky	4	5	3	640	5,961	1,088
Louisiana	11	31	2	7,662	35,316	579
New Mexico		1			1,488	
New York	2	2		(2)	[2] 539	
Ohio	22	16	2	715	8,453	1,649
Oklahoma	134	163		115,780	359,936	
Pennsylvania	111	26	4	6,718	11,059	2,566
Texas	42	90	2	51,734	191,022	337
West Virginia	66	46	11	10,757	41,909	11,141
Wyoming	4	7		27,950	12,675	
	493	579	30	243,084	1,099,891	20,115

[1] Charcoal included under combination processes in order to avoid disclosing the production of individual operators.

[2] Compression included under combination processes in order to avoid disclosing the production of individual operators.

Natural-gas gasoline produced in the United States in 1926, by States and by counties

State	County	Thousands of gallons	Thousands of dollars
Alaska	Third division	33	4
Arkansas	Ouachita	9,598	859
	Union	20,787	2,008
		30,385	2,867
California	Fresno	779	[1] 92
	Kern	76,316	[1] 9,005
	Los Angeles	229,337	[1] 27,061
	Orange	58,015	[1] 6,846
	Santa Barbara	8,955	[1] 1,057
	Ventura	15,964	[1] 1,884
		389,366	[1] 45,945
Colorado	Larimer	276	17
Illinois	Clark	64	7
	Crawford	2,849	281
	Cumberland	587	68
	Lawrence	6,487	611
		9,987	967
Kansas	Butler	4,510	401
	Chautauqua	600	48
	Cowley	7,349	548
	Greenwood	8,130	699
	Montgomery, Sumner, and Wilson	4,780	409
		25,369	2,105
Kentucky	Boyd and Clark	5,367	631
	Estill, Floyd, and Martin	969	120
	Lee	905	106
	Menifee and Wayne	448	57
		7,689	914
Louisiana	Caddo	8,673	873
	Claiborne	14,597	1,435
	De Soto, Red River, and Webster	2,811	252
	Morehouse	2,904	181
	Ouachita	14,572	951
		43,557	3,692
New Mexico	Eddy	1,488	146
New York	Allegany	539	66
Ohio	Athens, Carroll, and Cuyahoga	624	86
	Fairfield and Hocking	1,429	181
	Jefferson	92	9
	Knox, Lorain, and Medina	543	76
	Licking	3,146	402
	Monroe	516	64
	Muskingum, Noble, Richland, and Wayne	3,954	519
	Washington	513	65
		10,817	1,402
Oklahoma	Carter	13,440	1,142
	Creek	84,791	7,481
	Garfield	28,097	2,252
	Grady, Rogers, and Stephens	2,798	247
	Grant	11,373	518
	Hughes	15,550	1,503
	Kay	54,883	4,101
	Lincoln	23,763	2,057
	Muskogee	1,377	113
	Noble	8,035	659
	Nowata	5,967	514
	Okfuskee	7,249	698
	Okmulgee	17,053	1,531
	Osage	99,176	9,124
	Pawnee	10,155	904
	Payne	8,238	752
	Seminole	70,661	6,661

[1] Estimated.

Natural-gas gasoline produced in the United States in 1926, by States and by counties—Continued

State	County	Thousands of gallons	Thousands of dollars
Oklahoma (continued)	Tulsa	8,054	727
	Wagoner	876	80
	Washington	4,180	369
		475,716	41,433
Pennsylvania	Allegheny	2,273	301
	Armstrong and Beaver	195	24
	Butler	672	85
	Clarion	563	74
	Crawford	274	30
	Elk, Lawrence, and Potter	514	50
	Forest	1,154	132
	Greene	4,970	534
	McKean	2,138	278
	Venango	3,026	393
	Warren	2,667	330
	Washington	1,897	223
		20,343	2,454
Texas	Archer	3,867	379
	Brown	3,057	281
	Carson, Clay, and Coleman	6,494	637
	Cooke and Erath	4,004	387
	Eastland	69,738	6,690
	Freestone and Gray	2,082	197
	Harrison, Limestone, and Mitchell	878	86
	Hutchinson	10,274	991
	Navarro, Potter, and Reagan	7,989	760
	Palo Pinto	4,090	409
	Shackelford, Throckmorton, and Webb	9,707	918
	Stephens	72,731	6,552
	Wichita	38,014	3,514
	Wilbarger and Williamson	5,209	473
	Young	4,959	486
		243,093	22,760
West Virginia	Boone, Brooke, and Cabell	3,074	339
	Clay, Gilmer, and Hancock	454	56
	Doddridge	295	35
	Harrison	2,382	291
	Kanawha	21,915	2,657
	Jackson and Lincoln	7,538	818
	Lewis	5,243	659
	Marion	3,673	454
	Marshall, Wayne, and Wirt	911	103
	Monongalia	601	75
	Pleasants	890	111
	Ritchie	466	59
	Roane	4,023	484
	Tyler	2,677	337
	Wetzel	9,665	1,228
		63,807	7,706
Wyoming	Carbon, Fremont, Hot Springs, and Niobrara	2,357	197
	Natrona	38,268	3,737
		40,625	3,934
United States		1,363,090	136,412

Stocks at natural-gas gasoline plants, January 1 and December 31, 1926, in thousand of gallons

State	Raw natural-gas gasoline		Blended gasoline	
	Jan. 1	Dec. 31	Jan. 1	Dec. 31
Alaska	1		8	10
Arkansas	175	326		13
California	670	1,417	12	7
Colorado	34	51		
Illinois	127	174	5	
Kansas	407	409	6	3
Kentucky	87	103	8	10
Louisiana	765	925		
New Mexico		41		
New York	21	25	10	13
Ohio	253	296		
Oklahoma	6,979	8,080	[1] 737	1,046
Pennsylvania	1,348	1,082	301	171
Texas	2,632	4,820	[1] 55	54
West Virginia	1,671	1,467	138	102
Wyoming	150	229	[1] 100	33
	15,320	19,445	[1] 1,380	1,462

[1] Revised figures.

Natural-gas gasoline turned into crude-petroleum pipe lines in the United States, 1923–1926, by States, in thousands of gallons

State	1923	1924	1925	1926
Alaska			20	10
Arkansas				6,778
California	50,398	87,135	107,771	138,474
Illinois	26			12
Kansas				243
Kentucky				1
Louisiana	3,049	373	136	
Oklahoma	15,418	1,640	2,065	8,472
Pennsylvania	252			
Texas	3,529	347	171	91
West Virginia	25			
Wyoming	1,838			47
	74,535	89,495	110,163	154,128

Natural-gas gasoline produced in the United States, 1917–1926, by States, in thousands of gallons

Year	Arkansas	California	Colorado	Illinois	Kansas	Kentucky	Louisiana	New Mexico	New York
1917		28,818	[1]	4,934	1,175	3,818	4,980		[1]
1918		32,269	2	4,575	2,390	3,331	7,021		218
1919		40,386		6,060	3,284	5,136	10,063		458
1920		48,208		6,055	4,331	4,497	10,610		411
1921		58,220		7,536	3,587	4,242	15,341		366
1922	4,289	67,120		7,760	2,856	5,205	29,406		506
1923	16,183	173,329		7,356	8,775	7,601	40,720		408
1924	17,533	232,579		9,091	11,658	7,274	48,098		477
1925	19,686	303,180	35	9,874	19,592	7,685	43,489		414
1926	30,385	389,366	276	9,987	25,369	7,689	43,557	1,488	539

[1] Included under "Undistributed."

Natural-gas gasoline produced in the United States, 1917–1926, by States, in thousands of gallons—Continued

Year	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Undistributed	Total		
								Thousands of gallons	Value at plant	
									Thousands of dollars	Average per gallon (cents)
1917	5,440	115,123	13,826	6,920	32,669	-------	[2] 181	217,884	40,189	18.4
1918	6,745	163,701	15,775	7,326	37,604	1,579	-------	282,536	50,364	17.8
1919	8,801	189,995	20,284	9,337	52,150	5,581	-------	351,535	64,197	18.3
1920	10,016	178,857	21,151	32,956	58,941	8,711	-------	384,744	71,788	18.7
1921	9,100	185,341	19,856	77,141	54,646	14,558	-------	449,934	61,815	13.7
1922	8,600	189,404	18,518	95,405	56,796	19,967	-------	505,832	72,711	14.4
1923	10,035	270,249	19,132	177,765	63,381	21,292	-------	816,226	77,268	9.5
1924	9,443	301,062	19,254	186,571	61,549	29,272	-------	933,861	82,233	8.8
1925	8,701	390,861	18,850	214,092	58,201	32,777	[3] 33	1,127,470	120,383	10.7
1926	10,817	475,716	20,343	243,093	63,807	40,625	[3] 33	1,363,090	136,412	10.0

[2] Colorado and New York. [3] Alaska.

Natural gas produced and consumed in the United States and portion treated for recovery of natural-gas gasoline, 1917–1926

	Produced and delivered to consumers (millions of cubic feet)	Consumed (millions of cubic feet)	Treated for recovery of gasoline (millions of cubic feet)	Ratio (percentage) of natural gas treated for gasoline	
				To quantity produced and delivered to consumers	To quantity consumed
1917	795,110		429,288	54	
1918	721,001		449,109	62	
1919	745,916		480,404	64	
1920	798,210		496,431	62	
1921	662,052		465,097	70	
1922	762,546		545,139	71	
1923	[1] 1,006,976	1,006,967	875,711	87	87
1924	[2] 1,141,521	1,141,482	1,016,276	89	89
1925	[3] 1,188,571	1,188,439	1,040,390	88	88
1926:					
Arkansas	43,566	52,630	20,903	48	40
California [4]	204,915	204,915	284,365	139	139
Colorado	554	504	390	70	77
Illinois	3,808	3,808	3,674	96	96
Kansas	38,095	61,142	30,801	81	50
Kentucky [5]	10,410	18,126	26,521	255	146
Louisiana	157,423	148,886	111,537	71	75
New Mexico	921	921	884	96	96
New York	[6] 7,027	17,864	500	7	3
Ohio	47,363	115,719	45,533	96	39
Oklahoma	286,421	244,993	235,157	82	96
Pennsylvania	107,089	125,836	63,819	60	51
Texas [4 5]	[7] 175,392	187,341	181,243	103	97
West Virginia [8]	180,223	72,784	166,135	92	228
Wyoming	46,567	45,605	34,813	75	76
Other	3,245	11,779	25	-------	-------
	[9] 1,313,019	1,312,853	1,206,300	92	92

[1] Includes 9,000,000 cubic feet piped to Mexico.
[2] Includes 39,000,000 cubic feet piped to Canada and Mexico.
[3] Includes 132,000,000 cubic feet piped to Canada and Mexico.
[4] Large quantities of gas both before and after the recovery of gasoline were blown in the air or unaccounted for.
[5] Quantities of natural gas were piped from other States, treated for gasoline recovery, and residue gas returned to State in which produced.
[6] Includes 79,000,000 cubic feet piped to Canada.
[7] Includes 87,000,000 cubic feet piped to Mexico.
[8] Natural gas was treated for gasoline recovery and consumed in other States.
[9] Includes 166,000,000 cubic feet piped to Canada and Mexico.

Summary of monthly (preliminary) natural-gas gasoline and motor fuel statistics in the United States in 1926, in millions of gallons

	January	February	March	April	May	June	July	August	September	October	November	December	The year
Natural-gas gasoline (raw):													
Production by fields—													
Appalachian	11.2	10.1	10.2	8.7	6.6	5.8	5.2	5.1	5.7	8.1	9.5	10.6	96.8
Kentucky-Illinois	1.8	1.7	1.8	1.6	1.3	1.1	1.2	1.2	1.3	1.5	1.5	1.7	17.7
Oklahoma, Kansas, etc	38.3	36.7	41.9	42.2	42.6	41.1	42.3	42.9	42.0	44.5	44.2	44.4	503.1
Texas	17.6	16.3	19.1	18.2	18.4	17.7	18.4	19.2	19.6	21.5	22.5	23.7	232.2
Louisiana and Arkansas	5.8	5.5	6.2	6.0	6.4	6.2	6.5	6.5	6.3	6.5	6.8	7.0	75.7
Rocky Mountain	2.3	2.6	3.4	3.6	3.8	3.8	3.6	4.0	3.9	4.2	3.7	3.0	41.9
Total east of California	77.0	72.9	82.6	80.3	79.1	75.7	77.2	78.9	78.8	86.3	88.2	90.4	967.4
California	29.0	27.1	30.5	29.3	31.2	31.3	33.2	33.0	32.8	35.8	36.4	39.8	389.4
Total United States	106.0	100.0	113.1	109.6	110.3	107.0	110.4	111.9	111.6	122.1	124.6	130.2	1,356.8
Daily average	3.4	3.6	3.6	3.7	3.6	3.6	3.6	3.6	3.7	3.9	4.2	4.2	3.7
Indicated deliveries	104.3	99.4	110.1	108.9	106.9	104.4	111.2	113.6	115.7	122.3	125.7	130.5	1,353.0
Stocks at end of period	17.0	17.6	20.6	21.3	24.7	27.3	26.5	24.8	20.7	20.5	19.4	19.1	19.1
Blending at plants:													
Raw gasoline used	2.0	1.9	2.3	2.2	2.0	2.5	2.6	2.5	2.6	2.6	2.6	3.0	28.8
Naphtha used	3.2	3.1	3.0	3.2	4.2	4.1	3.3	3.4	3.7	3.9	3.6	3.9	42.6
Stocks of blends at end of period	2.1	1.9	1.6	1.4	2.0	1.5	1.9	1.8	2.1	2.1	1.6	1.8	1.8
Indicated output of motor fuel:													
Gasoline produced at refineries	974.7	892.9	1,002.5	1,020.4	1,061.4	1,047.7	1,071.2	1,089.6	1,065.1	1,106.1	1,102.3	1,154.9	12,588.8
Natural-gas gasoline—													
Blended at plants [1]	2.0	1.9	2.3	2.2	2.0	2.5	2.6	2.5	2.6	2.6	2.6	3.0	28.8
Sold to jobbers (estimate)	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	9.6
Benzol produced [2]	7.6	7.0	7.5	7.2	7.4	7.2	7.5	7.5	7.3	7.6	7.5	7.4	88.7
Total United States	985.1	902.6	1,013.1	1,030.6	1,071.6	1,058.2	1,082.1	1,100.4	1,075.8	1,117.1	1,113.2	1,166.1	12,715.9
Daily average	31.8	32.2	32.7	34.4	34.6	35.3	34.9	35.5	35.9	36.0	37.1	37.6	34.8

[1] Exclusive of California.

[2] Estimated with production of by-product coke as basis.

Spot price of Oklahoma natural-gas gasoline, grade A, on specified dates and monthly average, 1925–26, in cents per gallon

[Oil and Gas Journal]

Date	Cents	Date	Cents
1925		1926	
Jan. 5	9	Jan. 4	10.75–10.88
Jan. 12	9 – 9.25	Jan. 11	10.25–10.75
Jan. 19	9.25	Jan. 18	10 –10.5
Jan. 26	9.5 –10	Jan. 25	9.5 – 9.75
Average	9.28	Average	10.33
Feb. 2	10.25–10.5	Feb. 1	10
Feb. 9	11.75–12	Feb. 8	10.25–10.38
Feb. 16	13.25–13.5	Feb. 15	10.25
Feb. 23	13.25	Feb. 22	10
Average	12.22	Average	10.13
Mar. 2	12 –12.25	Mar. 1	9.5 – 9.75
Mar. 9	11.5	Mar. 8	9.5 – 9.75
Mar. 16	11	Mar. 15	9 – 9.25
Mar. 23	9.75–10	Mar. 22	9
Mar. 30	9.5	Mar. 29	9 – 9.25
Average	10.8	Average	9.3
Apr. 6	9 – 9.25	Apr. 5	9 – 9.13
Apr. 13	9.75–10	Apr. 12	8.88– 9
Apr. 20	10	Apr. 19	9
Apr. 27	9	Apr. 26	9 – 9.25
Average	9.5	Average	9.03
May 4	10.25	May 3	10.75–11
May 11	11.25	May 10	10.5 –10.75
May 18	12.5	May 17	11
May 25	14 –14.25	May 24	10.5
Average	12	Average	10.75
June 1	14.5	June 1	10.25–10.5
June 8	15.5	June 7	9.75–10
June 15	15.5 –15.75	June 14	9.25
June 22	15.75	June 21	9.63– 8.88
June 29	15.25–15.38	June 28	8.5
Average	15.34	Average	9.35
July 6	14.75	July 6	8.25
July 13	14.5	July 12	8.25– 8.5
July 20	14.5	July 19	8.25– 8.5
July 27	14	July 26	8.5 – 8.63
Average	14.44	Average	8.39
Aug. 3	13.5 –13.75	Aug. 2	8.5 – 8.63
Aug. 10	13 –13.25	Aug. 9	8.63– 8.75
Aug. 17	12.63–12.75	Aug. 16	9.25
Aug. 24	11.75–12	Aug. 23	9.75
Aug. 31	11.75–11.88	Aug. 30	10
Average	12.63	Average	9.25
Sept. 7	11.5	Sept. 7	10.25–10.5
Sept. 14	12	Sept. 13	10.25–10.38
Sept. 21	13.25	Sept. 20	10.25
Sept. 28	14.5	Sept. 27	9.75–10
Average	12.81	Average	10.20
Oct. 5	14 –14.25	Oct. 4	9.5 – 9.75
Oct. 12	13.75–14	Oct. 11	9.25– 9.5
Oct. 19	12.75–13	Oct. 18	9 – 9.25
Oct. 26	12 –12.25	Oct. 25	9 – 9.25
Average	13.25	Average	9.31
Nov. 2	11.5 –11.75	Nov. 1	9.25– 9.5
Nov. 9	11.5	Nov. 8	9.25– 9.5
Nov. 16	11.25–11.5	Nov. 15	9.25– 9.38
Nov. 23	11.25	Nov. 22	9.25– 9.5
Nov. 30	11.25	Nov. 29	9.13– 9.25
Average	11.4	Average	9.3
Dec. 7	11.25	Dec. 6	9.25– 9.5
Dec. 14	11	Dec. 13	9.5
Dec. 21	10.75–10.88	Dec. 20	9.75
Dec. 28	10.75	Dec. 27	9.75– 9.88
Average	10.95	Average	9.61

SILICA[1]

INTRODUCTION

Silica (SiO_2) occurs, in deposits of commercial importance, in many different forms, such as vein quartz, as a constituent of pegmatites, as sand, sandstone, quartzite, or flint, as tripoli, and as diatomite or diatomaceous earth. In some forms, such as rose, smoky, and amethystine quartz, it has value as gems. This chapter deals with silica of all kinds except gem quartz, silica sand or sandstone used for making glass, and silica used in the form of sand, gravel, and crushed material for building, for concrete and mortar, for foundry and furnace work, and for cutting and grinding stone. Such material as is not here included is either gem material or sand, is commercially so designated, and is therefore considered in other chapters of Mineral Resources. Tripoli and diatomite were, in the past, largely consumed as abrasives and are considered in the chapter on abrasive materials.

For a comprehensive discussion of the occurrence, mining or quarrying, methods of preparation, and uses of the various forms of silica, the reader is referred to a recent report by W. M. Weigel, entitled "Technology and Uses of Silica and Sand," Bulletin 266, Bureau of Mines, 1927, which may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 40 cents the copy.

PRODUCTION

The total production of the silica materials considered in this chapter, including tripoli and diatomite, as given in the table that follows, showed an increase of 6 per cent in quantity and 11 per cent in value in 1926 over 1925. Quartz (crude and ground) from pegmatite dikes, from veins, and from quartzite increased 9 per cent in quantity and 34 per cent in value. Ground sand and sandstone increased 2 per cent in quantity and 4 per cent in value. Tripoli increased 7 per cent in quantity and 20 per cent in value. Diatomite increased 19 per cent in quantity and 17 per cent in value.

[1] Statistics on production were prepared by Estelle R. Phillips, of the Bureau of Mines. Figures on imports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Silica sold or used by producers in the United States for pottery, paints, fillers, polishers, abrasives, and other uses, 1924–1926

Material	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Quartz (vein quartz, pegmatite, and quartzite)	23,761	$203,177	25,444	$205,376	27,743	$274,33[illegible]
Sand and sandstone [1]	230,432	1,655,056	263,981	1,857,263	270,468	1,928,79[illegible]
Tripoli (ground and otherwise prepared)	28,476	389,409	29,388	434,886	31,369	523,609
Diatomite	63,163	693,917	73,030	922,281	87,126	1,081,564
	345,832	2,941,559	391,843	3,419,806	416,706	3,808,299

[1] Includes only finely ground material. Figures probably incomplete.

QUARTZ

The States from which production of quartz (from pegmatite dikes, from veins, and from quartzite) was reported in 1926 were California, Connecticut, Maine, Maryland, Massachusetts, Nevada, New Hampshire, New York, North Carolina, Pennsylvania, Virginia, Washington, and Wisconsin. California reported the largest output.

The total quantity of crude, crushed, and ground quartz sold or used by producers in 1926 amounted to 27,743 short tons, valued at $274,333. This total consisted of 22,230 tons of crude and crushed quartz, valued at $159,052, and 5,513 tons of ground quartz, valued at $115,281. Some of the crude material included in the 22,230 tons was purchased by others who ground it and produced 10,831 tons of ground quartz, valued at $270,361, making a total of 16,344 tons of ground quartz, valued at $385,642.

Average values f. o. b. mines for the crude quartz reported by individual producers ranged from $2.24 to $10.35 a short ton, with an average sales value of $5.11 for the total quantity reported for the country. Corresponding values for crushed quartz ranged from $5.50 to $19.62, and averaged $12.48 a ton for the total output.

Average values of the ground quartz reported by individual producers ranged widely, from about $5.50 to $38.50 a ton. The average sales value of all ground quartz here considered was $23.60 a ton. Sales were reported by the following companies, some of which imported their material from other States:

American Encaustic Tiling Co. (Ltd.), 2030 East Fifty-second Street, Los Angeles, Calif.
American Grinding Co., 612 Pacific Mutual Building, Los Angeles, Calif.
Apex Engineering Co., 609 Rookery Building, Spokane, Wash.
Baeder-Adamson Co., Philadelphia, Pa.
Eureka Flint & Spar Co., Trenton, N. J.
Flynt Silica and Spar Co., 1047 Richmond Street, Los Angeles, Calif.
Lithowhite Silex Co., New Milford, Conn.
Maryland Quartz Co., 73 Munsey Building, Baltimore, Md.
Oliver Quartz Co., Charlotte, N. C.
Spicky Polish Corporation, 214 Front Street, San Francisco, Calif.
Standard Sanitary Manufacturing Co., Box W, Richmond, Calif.
United States Sandpaper Co., Williamsport, Pa.

Other companies which reported "crushed" (not "ground") material were as follows:

The Enos Adams Co., Bennington, Vt. (mill at Adams, Mass.).
San Jacinto Rock Products Co., San Jacinto, Calif.
Stockton Mineral Products Co., Stockton, Calif.
Wausau Abrasives Co., P. O. Box 436, Wausau, Wis.

Quartz sold or used by producers in the United States, 1917–1926

Year	Crude		Ground [1]		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	126,575	$120,856	16,098	$197,213	142,673	$318,069
1918	61,008	121,888	10,732	137,442	71,740	259,330
1919	51,774	135,187	11,558	238,384	63,332	373,571
1920	59,423	142,397	8,767	177,953	68,190	320,350
1921	8,570	39,660	2,682	45,297	11,252	84,957
1922	5,085	23,093	5,568	78,254	10,653	101,347
1923	14,159	66,723	6,442	126,907	20,601	193,630
1924	20,570	123,099	3,191	80,078	23,761	203,177
1925	22,312	143,861	3,132	61,515	25,444	205,376
1926	22,230	159,052	5,513	115,281	27,743	274,333

[1] In order to avoid duplication, the ground material shown here is only that ground by the original producers of the crude quartz or by grinders who purchase from small miners not reporting their production.

Quartz (crude, crushed, and ground [1]) sold or used by producers in the United States in 1926, by States

State	Short tons	Value	State	Short tons	Value
California	8,902	$103,016	New York	2,135	$13,121
Connecticut	246	1,678	North Carolina	2,134	17,457
Maine	328	1,050	Undistributed [2]	6,748	77,326
Maryland	4,681	47,507			
Nevada	2,292	12,125		27,743	274,333
New Hampshire	277	1,053			

[1] In order to avoid duplication, the ground material included is only that ground by the original producers of the crude quartz or by grinders who purchase from small miners not reporting their production.
[2] Massachusetts, Pennsylvania, Virginia, Washington, and Wisconsin.

GROUND SAND AND SANDSTONE

Ground sand and sandstone amounting to 270,468 short tons, valued at $1,928,793, was sold or used in 1926 by producers in Illinois, Missouri, New Jersey, Ohio, Pennsylvania, Virginia, West Virginia, and Wisconsin.

Values ranged from about $4 to over $20 per ton. This wide range is due in part to differences in purity, fineness, and perfection of sizing. Thus the average value of $7.13 per ton indicated by the total quantity and value of production is of little significance.

The following producers reported ground sand or sandstone in 1926:

Clinch Mountain Silica Sand Corporation, Box 476, Richmond, Va.
Golding Sons Co., Trenton, N. J.
Michigan Quartz Silica Co., Milwaukee, Wis.
National Silica Co., Oregon, Ill.
National Silica Works, Berkeley Springs, W. Va.
New Jersey Pulverizing Co., 15 Park Row, New York, N. Y.
Ohio Silica Co., East Liverpool, Ohio.
Ottawa Silica Co., Ottawa, Ill.

Pennsylvania Glass Sand Co. (grinds in New Jersey, Pennsylvania, and West Virginia), Lewistown, Pa.
Pioneer Silica Co., Pacific, Mo.
Potters Mining & Milling Co., East Liverpool, Ohio.
Wedron Silica Co., First National Bank Building, Chicago, Ill.

Ground sand and sandstone sold or used by producers in the United States, 1917–1926 [1]

Year	Short tons	Value	Year	Short tons	Value
1917	532,454	$1,195,142	1922	163,295	$1,061,057
1918	98,956	620,584	1923	249,467	1,672,961
1919	47,277	288,890	1924	230,432	1,655,056
1920	158,395	1,183,014	1925	263,981	1,857,263
1921	105,887	802,450	1926	270,468	1,928,793

[1] Includes only finely ground material. Figures probably incomplete.

Ground sand and sandstone sold or used by producers in the United States, 1925–26, by States [1]

	1925		1926	
	Short tons	Value	Short tons	Value
Illinois and Missouri	88,692	$533,287	88,211	$549,058
New Jersey	59,218	278,380	65,001	299,349
North Carolina,[2] Virginia, and West Virginia	53,061	477,746	51,375	450,989
Ohio, Pennsylvania, and Wisconsin [2]	63,010	567,850	65,881	629,397
	263,981	1,857,263	270,468	1,928,793

[1] Includes only finely ground material. Figures probably incomplete.
[2] None reported from North Carolina for 1926 or from Wisconsin for 1925.

IMPORTS

Data on imports of silica materials are found in the records of the Bureau of Foreign and Domestic Commerce under the classifications "silica, crude," "silica, for use as pigment," and "flint, flints, and flint stones, unground." Imports of crude silica amounting to 27 short tons, valued at $149, were reported for 1926; 22 tons, valued at $486, for 1925; 12 tons, valued at $254, for 1924; and 34 tons, valued at $550, for 1923. No imports of silica for use as pigment have been reported. The imports of "flint, flints, and flint stones, unground," are flint pebbles for grinding mills and for other uses such as are listed in this report. The imports of this last class of material amounted to 15,091 short tons, valued at $120,078, in 1926, as compared with 16,240 tons, valued at $105,041, in 1925.

France was the source of 63 per cent of the "flint, flints, and flint stones, unground," imported in 1926, as compared with 76 per cent in 1925, 67 per cent in 1924, and 56 per cent in 1923.

The values assigned to the imports considered in the following tables are those upon which the import duties in the United States are levied and represent the foreign market value (or the export value, if higher) plus cost of containers and all expenses incident to placing merchandise ready for shipment to the United States, including export tax, if any.

"Flint, flints, and flint stones, unground," imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	(1)	$197,156	1922	16,040	$145,805
1918	(1)	127,808	1923	15,952	130,974
1919	19,798	250,096	1924	17,473	114,958
1920	26,636	338,630	1925	16,240	105,041
1921	10,084	116,157	1926	15,091	120,078

[1] Quantities not recorded prior to July, 1918. During last six months of 1918 the imports were 5,224 tons, valued at $55,440.

"Flint, flints, and flint stones, unground," imported into the United States, 1924–1926, by countries

Country	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Algeria and Tunisia					104	$477
Argentina	(1)	$20				
Belgium	1,929	26,089	1,463	$23,547	1,680	24,924
Canada	6	84			3	23
Denmark	3,681	33,892	2,284	21,494	3,454	39,120
France	11,636	53,080	12,309	59,247	9,475	52,522
Germany	184	1,497	1	16		
Japan			32	358		
United Kingdom	37	296	(1)	6	375	3,012
West Indies—British			151	373		
	17,473	114,958	16,240	105,041	15,091	120,078

[1] Less than 1 ton.

NATURAL GAS

By G. R. Hopkins [1]

The natural-gas industry in the United States continued to grow slowly but steadily in 1926 when 1,313,019,000,000 cubic feet of gas was produced and delivered to consumers, an increase of 10 per cent over 1925. Of this amount 166,000,000 cubic feet was piped to Mexico and Canada, and 1,312,853,000,000 cubic feet was consumed in the United States in 1926. The value of the gas per thousand cubic feet at the wells increased from 9.4 cents in 1925 to 9.5 cents in 1926, and at points of consumption from 22.3 cents in 1925 to 22.8 cents in 1926. Neither of these figures, however, equaled those of 1923 or of some previous years.

Domestic (household) consumers used 22 per cent of the total consumption of natural gas in 1926, and industrial concerns 78 per cent. This indicates a slight growth in amount consumed by the latter in 1926. The total value of domestic consumption, however, was greater, as domestic users paid an average of 58.1 cents per thousand cubic feet, as compared with 12.8 cents by industrial concerns. In 1926 there were 3,731,000 domestic consumers of natural gas, as compared with 3,508,000 in 1925. This represents a gain of 223,000, which is, with the exception of 1913 and 1922, the largest yearly increase ever recorded. California and Texas each recorded an increase of about 70,000 in number of domestic consumers and far surpassed the other States in this respect.

The relative rank of the three chief gas-producing States was unchanged in 1926. Oklahoma, which ranks first, recorded a 15 per cent gain in output; California, which ranks second, a 9 per cent gain; but production in West Virginia, the next ranking State, showed a slight decrease. Texas registered a material gain in output and not only took fourth place from Louisiana but threatens to displace West Virginia in the near future.

The tendency to extract the greatest possible amount of natural-gas gasoline from natural gas before consumption of the gas was very marked in 1926. A total of 1,206,300,000,000 cubic feet of natural gas was treated for the recovery of natural-gas gasoline in 1926, which is equivalent to 92 per cent of the total production. In 1925 the proportion treated was 88 per cent.

The total consumption of natural gas (including residue gas from natural-gas gasoline plants) by industrial users in 1926 amounted to

[1] Figures compiled by H. Backus, of the Bureau of Mines.

1,023,678,000,000 cubic feet, an increase over 1925 of 12 per cent. The consumption of natural gas for field and industrial uses, exclusive of carbon black, again showed an increase.

Though carbon black output showed an increase in 1926 over 1925, the amount of natural gas consumed in its manufacture decreased. The increased output was due to an increase in percentage of recovery.

Oklahoma, because of its importance as a producer of petroleum and natural-gas gasoline, ranked first among the States in the use of natural gas for field purposes; that is, for drilling, pumping, and operating natural-gas gasoline recovery plants. Louisiana, by reason of being the chief carbon black producer, led in the consumption of natural gas for "other industrial" purposes.

The interstate movement of natural gas in 1926 amounted to 209,527,000,000 cubic feet, a slight increase over 1925. The movement from West Virginia to Ohio and Pennsylvania continued to be of first importance. Of more than passing interest was the increase in the counter movement of gas from Ohio to West Virginia.

Summary of statistics for natural gas in the United States, 1922–1926

	1922	1923	1924	1925	1926
Natural gas consumed:					
Domestic—millions of cubic feet	254,413	277,050	285,152	272,146	289,175
Industrial—					
Carbon black—do	53,629	109,096	156,514	140,366	130,321
Field—do	197,850	343,076	393,437	423,524	478,188
Other industrial—do	256,654	277,745	306,379	352,403	415,169
	762,546	1,006,967	1,141,482	1,188,439	1,312,853
Domestic—per cent	33.4	27.5	25	23	22
Industrial—do	66.6	72.5	75	77	78
Treated for natural-gas gasoline:					
Millions of cubic feet	545,139	875,711	1,016,276	1,040,390	1,206,300
Per cent of total consumption	71.5	87.0	89	88	92
Domestic consumers—thousands	3,015	3,234	3,443	[1] 3,508	3,731
Value of natural gas at wells:					
Total—thousands of dollars	84,873	100,849	105,779	112,047	124,693
Average per M cubic feet—cents	11.1	10.0	9.3	9.4	9.5
Value of natural gas at points of consumption:					
Total—thousands of dollars	221,535	239,995	253,830	265,184	299,125
Domestic—do	126,902	142,317	154,075	152,494	167,940
Industrial—do	94,633	97,678	99,755	112,690	131,185
Average per M cubic feet—					
Domestic—cents	49.9	51.4	54.0	56.0	58.1
Industrial—do	18.6	13.4	11.6	12.3	12.8
Domestic and industrial—do	29.1	23.8	22.2	22.3	22.8
Natural-gas gasoline (raw):					
Quantity—thousands of gallons	505,832	816,226	933,861	1,127,470	1,363,090
Value at plants—					
Total—thousands of dollars	72,711	77,268	82,233	120,383	136,412
Average per gallon—cents	14.4	9.5	8.8	10.7	10.0
Carbon black:					
Quantity—thousands of pounds	67,795	138,263	186,872	177,417	180,576
Value at plants—					
Total—thousands of dollars	5,820	11,692	11,565	9,640	9,939
Average per pound—cents	8.6	8.5	6.2	5.4	5.5

[1] Revised figures.

Natural gas produced and consumed in the United States, 1925–26

State	Produced and delivered to consumers, including deliveries in other States						Consumed, including receipts from other States			
	Quantity		Estimated value at the wells		Value at points of consumption		Quantity		Value at points of consumption	
	M cubic feet	Per cent of total	Total	Average per M cubic feet (cents)	Total	Average per M cubic feet (cents)	M cubic feet	Per cent of total	Total	Average per M cubic feet (cents)
1925										
Ark	41,878,000	3.5	$2,504,000	6.0	$5,394,000	12.9	51,543,000	4.3	$6,639,000	12.9
Calif	187,789,000	15.8	14,084,000	7.5	32,587,000	17.4	187,789,000	15.8	32,587,000	17.4
Colo	574,400	.1	61,000	10.6	61,100	10.6	574,400	.1	61,100	10.6
Ill	4,165,000	.4	748,000	18.0	865,000	20.8	4,165,000	.4	865,000	20.8
Ind	1,168,000	.1	424,000	36.3	504,000	43.2	1,786,000	.2	863,000	48.3
Kans	26,917,000	2.3	2,213,000	8.2	9,991,000	37.1	48,684,000	4.1	12,019,000	24.7
Ky	10,770,000	.9	1,037,000	9.6	3,213,000	29.8	18,601,000	1.6	5,726,000	30.8
La	152,620,000	12.8	4,670,000	3.1	8,125,000	5.3	148,000,000	12.4	6,515,000	4.4
Mich	400	(1)	40	10.0	200	50.0	400	(1)	200	50.0
Mo	34,000	(1)	3,100	9.1	29,700	87.4	5,372,000	.5	4,710,700	87.7
Mont	1,496,000	.1	55,000	3.7	350,000	23.4	2,608,000	.2	610,000	23.4
N. Y	[2] 6,210,000	.5	1,863,000	30.0	3,778,000	60.8	16,503,000	1.4	10,051,000	60.9
Ohio	43,235,000	3.6	7,752,000	17.9	22,377,000	51.8	111,969,000	9.4	58,635,000	52.4
Okla	249,285,000	21.0	18,447,000	7.4	36,121,000	14.5	209,458,000	17.6	27,464,000	13.1
Pa	101,632,000	8.6	24,392,000	24.0	47,098,000	46.3	119,475,000	10.0	53,946,000	45.2
S. Dak	4,200	(1)	400	9.5	2,300	54.8	4,200	(1)	2,300	54.8
Tenn	8,500	(1)	800	9.4	2,000	23.5	8,500	(1)	2,000	23.5
Tex	[3] 134,872,000	11.3	7,040,000	5.2	19,715,000	14.6	142,485,000	12.0	21,982,000	15.4
W. Va	180,345,000	15.2	24,851,000	13.8	70,903,000	39.3	74,250,000	6.2	18,122,000	24.4
Wyo	45,539,000	3.8	1,899,000	4.2	4,149,000	9.1	44,427,000	3.7	3,889,000	8.8
Other [4]	28,500	(1)	2,660	9.3	5,700	20.0	736,500	.1	494,700	67.2
	1,188,571,000	100.0	112,047,000	9.4	265,271,000	22.3	1,188,439,000	100.0	265,184,000	22.3
1926										
Ark	43,566,000	3.3	2,000,000	4.6	5,817,000	13.4	52,630,000	4.0	7,027,000	13.4
Calif	204,915,000	15.6	16,803,000	8.2	35,495,000	17.3	204,915,000	15.6	35,495,000	17.3
Colo	553,800	(1)	50,000	9.0	130,000	23.5	503,800	(1)	125,000	24.8
Ill	3,808,000	.3	762,000	20.0	863,000	22.7	3,808,000	.3	863,000	22.7
Ind	901,000	.1	377,000	41.8	379,000	42.1	1,854,000	.1	906,000	48.9
Kans	38,095,000	2.9	2,884,000	7.6	12,547,700	32.9	61,142,000	4.7	14,381,000	23.5
Ky	10,410,000	.8	961,000	9.2	3,378,000	32.4	18,126,000	1.4	6,119,000	33.8
La	157,423,000	12.0	4,864,000	3.1	8,768,000	5.6	148,886,000	11.3	6,912,000	4.6
Mich	400	(1)	40	10.0	200	50.0	400	(1)	200	50.0
Mo	1,000	(1)	100	10.0	700	70.0	5,819,000	.4	4,997,400	85.9
Mont	2,283,000	.2	86,000	3.8	450,000	19.7	3,295,000	.2	650,000	19.7
N. Mex	921,000	.1	72,000	7.8	75,000	8.1	921,000	.1	75,000	8.1
N. Y	[5] 7,027,000	.5	2,237,000	31.8	4,499,000	64.0	17,864,000	1.4	11,443,000	64.1
Ohio	47,363,000	3.6	8,781,000	18.5	25,403,000	53.6	115,719,000	8.8	65,982,000	57.0
Okla	286,421,000	21.8	22,828,000	8.0	42,140,000	14.7	244,993,000	18.7	33,251,000	13.6
Pa	107,089,000	8.2	25,112,000	23.4	50,040,000	46.7	125,836,000	9.6	56,724,000	45.1
S. Dak	10,100	(1)	1,010	10.0	14,000	138.6	10,100	(1)	14,000	138.6
Tenn	11,500	(1)	1,150	10.0	1,900	16.5	11,500	(1)	1,900	16.5
Tex	[6] 175,392,000	13.4	10,085,000	5.7	28,165,000	16.1	187,341,000	14.3	30,807,000	16.4
W. Va	180,223,000	13.7	24,582,000	13.6	76,396,000	42.4	72,784,000	5.5	18,337,000	25.2
Wyo	46,567,000	3.5	2,203,000	4.7	4,669,000	10.0	45,605,000	3.5	4,474,000	9.8
Other [4]	38,200	(1)	3,700	9.7	6,500	17.0	789,200	.1	540,500	68.5
	1,313,019,000	100.0	124,693,000	9.5	299,238,000	22.8	1,312,853,000	100.0	299,125,000	22.8

[1] Less than 0.1 per cent.
[2] Includes 68,000 M cubic feet consumed in Canada.
[3] Includes 64,000 M cubic feet consumed in Mexico.
[4] 1925: Alaska, Iowa, Maryland (consumption only), New Mexico, and North Dakota; 1926: Alaska, Maryland (consumption only), and North Dakota.
[5] Includes 79,000 M cubic feet consumed in Canada.
[6] Includes 87,000 M cubic feet consumed in Mexico.

Natural gas consumed in the United States, 1925–26

State	Domestic				Industrial							
			Value at points of consumption		Field (drilling, pumping, and operating gasoline recovery plants)		Other industrial, including use in manufacture of carbon black			Total industrial		
	Number of consumers	M cubic feet	Total	Average (cents)	M cubic feet (estimated)	Value at points of consumption (estimated)	M cubic feet	Value at points of consumption		M cubic feet	Value at points of consumption	
								Total	Average (cents)		Total	Average (cents)
1925												
Arkansas	47,360	6,146,000	$2,753,000	44.8	36,103,000	$2,159,000	9,294,000	$1,727,000	18.6	45,397,000	$3,886,000	8.6
California	561,710	18,684,000	13,572,000	72.6	109,333,000	8,200,000	59,772,000	10,815,000	18.1	169,105,000	19,015,000	11.2
Colorado	9	900	500	55.6	547,000	60,000	26,500	600	2.3	573,500	60,600	10.6
Illinois	11,700	250,000	162,000	64.8	3,915,000	703,000				3,915,000	703,000	18.0
Indiana	16,480	747,000	370,000	49.5	31,000	11,000	1,008,000	482,000	47.8	1,039,000	493,000	47.4
Kansas	[1] 140,790	9,647,000	6,301,000	65.3	10,263,000	844,000	28,774,000	4,874,000	16.9	39,037,000	5,718,000	14.6
Kentucky	130,780	11,185,000	4,605,000	41.2	797,000	77,000	6,619,000	1,044,000	15.8	7,416,000	1,121,000	15.1
Louisiana	35,680	5,219,000	1,583,000	30.3	18,085,000	553,000	124,696,000	4,379,000	3.5	142,781,000	4,932,000	3.5
Michigan	5	400	200	50.0								
Missouri	100,120	4,846,000	4,557,700	94.1			526,000	153,000	29.1	526,000	153,000	29.1
Montana	5,705	1,303,000	574,000	44.1	254,000	9,000	1,051,000	27,000	2.6	1,305,000	36,000	2.8
New York	222,750	16,055,000	9,872,000	61.5	254,000	76,000	194,000	103,000	53.1	448,000	179,000	40.0
Ohio	1,094,120	83,722,000	46,848,000	56.0	4,148,000	744,000	24,099,000	11,043,000	45.8	28,247,000	11,787,000	41.7
Oklahoma	155,780	16,592,000	8,814,000	53.1	137,414,000	10,171,000	55,422,000	8,479,000	15.3	192,866,000	18,650,000	9.7
Pennsylvania	582,520	55,797,000	33,500,000	60.0	7,845,000	1,883,000	55,833,000	18,563,000	33.2	63,678,000	20,446,000	32.1
South Dakota	53	4,200	2,300	54.8								
Tennessee	48	8,500	2,000	23.5								
Texas	212,240	15,179,000	9,888,000	65.1	61,819,000	3,227,000	65,487,000	8,867,000	13.5	127,306,000	12,094,000	9.5
West Virginia	167,070	23,984,000	7,739,000	32.3	12,404,000	1,709,000	37,862,000	8,674,000	22.9	50,266,000	10,383,000	20.7
Wyoming	10,710	2,169,000	927,000	42.7	20,261,000	845,000	21,997,000	2,117,000	9.6	42,258,000	2,962,000	7.0
Other [2]	12,370	607,000	423,300	69.7	21,000	2,000	108,500	69,400	64.0	129,500	71,400	55.1
	[1] 3,508,000	272,146,000	152,494,000	56.0	423,524,000	31,273,000	492,769,000	81,417,000	16.5	916,293,000	112,690,000	12.3
1926												
Arkansas	52,210	7,824,000	3,532,000	45.1	35,195,000	1,615,000	9,611,000	1,880,000	19.6	44,806,000	3,495,000	7.8
California	632,600	20,960,000	14,801,000	70.6	123,953,000	10,177,000	60,002,000	10,517,000	17.5	183,955,000	20,694,000	11.2
Colorado	1,974	78,800	68,000	86.3	378,000	34,000	47,000	23,000	48.9	425,000	57,000	13.4
Illinois	11,910	203,000	142,000	70.0	3,605,000	721,000				3,605,000	721,000	20.0
Indiana	13,860	722,000	386,000	53.5	72,000	30,000	1,060,000	490,000	46.2	1,132,000	520,000	45.9

Kansas	142,730	10,133,000	6,905,000	68.1	11,536,000	873,000	39,473,000	6,603,000	16.7	51,009,000	7,476,000	14.7
Kentucky	137,500	12,404,000	5,258,000	42.4	874,000	81,000	4,848,000	780,000	16.1	5,722,000	861,000	15.0
Louisiana	35,710	4,413,000	1,669,000	37.8	25,763,000	796,000	118,710,000	4,447,000	3.7	144,473,000	5,243,000	3.6
Michigan	6	400	200	50.0								
Missouri	100,300	5,288,000	4,843,400	91.6			531,000	154,000	29.0	531,000	154,000	29.0
Montana	6,345	1,383,000	589,000	42.6	290,000	11,000	1,622,000	50,000	3.1	1,912,000	61,000	3.2
New Mexico	140	28,000	5,000	17.9	893,000	70,000				893,000	70,000	7.8
New York	235,290	16,909,000	11,004,000	65.1	491,000	157,000	464,000	282,000	60.8	955,000	439,000	46.0
Ohio	1,124,080	87,672,000	53,970,000	61.6	3,130,000	580,000	24,917,000	11,432,000	45.9	28,047,000	12,012,000	42.8
Oklahoma	166,660	17,617,000	8,840,000	50.2	159,269,000	12,694,000	68,107,000	11,717,000	17.2	227,376,000	24,411,000	10.7
Pennsylvania	599,900	56,148,000	33,912,000	60.4	7,988,000	1,873,000	61,700,000	20,939,000	33.9	69,688,000	22,812,000	32.7
South Dakota	375	10,100	14,000	138.6								
Tennessee	80	5,500	1,300	23.6	6,000	600				6,000	600	10.0
Texas	279,380	18,045,000	11,986,000	66.4	69,369,000	3,996,000	99,927,000	14,825,000	14.8	169,296,000	18,821,000	11.1
West Virginia	165,800	25,700,000	8,166,000	31.8	14,225,000	1,940,000	32,859,000	8,231,000	25.0	47,084,000	10,171,000	21.6
Wyoming	11,280	2,880,000	1,314,000	45.6	21,136,000	1,000,600	21,589,000	2,160,000	10.0	42,725,000	3,160,000	7.4
Other [2]	12,670	751,200	534,100	71.1	15,000	1,400	23,000	5,000	21.7	38,000	6,400	16.8
	3,730,800	289,175,000	167,940,000	58.1	478,188,000	36,650,000	545,490,000	94,535,000	17.3	1,023,678,000	131,185,000	12.8

[1] Revised figures.
[2] 1925: Alaska, Iowa, Maryland, New Mexico, and North Dakota; 1926: Alaska, Maryland, and North Dakota.

Interstate transportation of natural gas, 1925–26, in thousands of cubic feet

State in which gas was produced	State to which gas was transported	1925	1926
Colorado	Wyoming		50,000
Indiana	Kentucky	346,000	408,000
Kansas	Missouri	5,338,000	5,818,000
	Oklahoma	167,000	414,000
		5,505,000	6,232,000
Kentucky	West Virginia	1,603,000	1,595,000
Louisiana	Arkansas	8,370,000	8,063,000
	Texas	6,321,000	6,419,000
		14,691,000	14,482,000
New York	Canada	68,000	79,000
	Pennsylvania	28,000	17,000
		96,000	96,000
Ohio	Indiana	964,000	1,361,000
	West Virginia	824,000	4,709,000
		1,788,000	6,070,000
Oklahoma	Arkansas	549,000	236,000
	Kansas	27,272,000	29,279,000
	Texas	12,173,000	12,327,000
		39,994,000	41,842,000
Pennsylvania	New York	10,389,000	10,933,000
	Ohio	166,000	1,429,000
	West Virginia	2,122,000	2,419,000
		12,677,000	14,781,000
Texas	Arkansas	746,000	765,000
	Louisiana	10,071,000	5,945,000
	Mexico	64,000	87,000
		10,881,000	6,797,000
West Virginia	Kentucky	9,088,000	8,903,000
	Maryland	708,000	751,000
	Ohio	70,356,000	72,997,000
	Pennsylvania	30,492,000	33,511,000
		110,644,000	116,162,000
Wyoming	Montana	1,112,000	1,012,000
		199,337,000	209,527,000

Natural gas produced in the United States and delivered to consumers, 1917–1926, by States, in millions of cubic feet

Year	Arkansas	California	Illinois	Indiana	Kansas	Kentucky	Louisiana	Montana	New York	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Others	Total	Value at points of consumption	
																		Total (thousands of dollars)	Average per M cubic feet (cents)
1917	5,610	49,427	4,439	1,712	24,439	2,802	31,287	334	8,372	68,917	137,384	133,397	17,047	308,617	[1] 1,223	103	795,110	142,089	17.9
918	5,295	39,719	4,473	1,667	27,825	3,022	36,094	177	8,461	61,261	124,317	123,813	13,440	265,161	4,339	1,937	721,001	153,554	21.3
1919	5,587	55,607	3,825	1,407	16,150	2,057	47,062	858	8,124	63,153	163,649	113,489	24,710	234,095	6,014	129	745,916	160,888	21.6
1920	9,027	66,041	3,013	1,779	21,158	3,345	58,274	818	8,419	58,938	154,467	125,787	37,063	239,719	10,312	50	798,210	196,194	24.6
1921	4,260	75,942	2,646	1,066	15,717	4,820	58,004	336	6,583	47,412	124,058	86,144	44,504	174,921	15,608	31	662,052	174,617	26.4
1922	9,700	84,580	3,383	947	20,289	5,872	70,267	486	6,947	51,481	140,631	101,276	47,945	195,288	23,427	27	762,546	221,535	29.1
1923	24,215	131,434	4,049	880	30,913	11,953	112,031	1,470	6,497	53,812	203,082	112,562	74,535	203,867	35,523	153	1,006,976	240,001	23.8
1924	36,616	189,692	4,072	998	25,580	12,875	160,945	1,071	6,196	47,396	214,452	105,863	107,247	182,285	46,036	197	1,141,521	253,856	22.2
1925	41,878	187,789	4,165	1,168	26,917	10,770	152,620	1,496	6,210	43,235	249,285	101,632	134,872	180,345	45,539	650	1,188,571	265,271	22.3
1926	43,566	204,915	3,808	901	38,095	10,410	157,423	2,283	7,027	47,363	286,421	107,089	175,392	180,223	46,567	1,536	1,313,019	299,238	22.8

[1] Includes Colorado.

Statistics of natural gas in the United States, 1917–1926

Year	Produced and delivered to consumers (billions of cubic feet)	Treated for recovery of natural-gas gasoline		Domestic consumption				Industrial consumption					
		Billions of cubic feet	Per cent of total consumption	Number of consumers (thousands)	Billions of cubic feet	Per cent of total consumption	Average value at points of consumption per M cubic feet (cents)	Field (billions of cubic feet)	Carbon black (billions of cubic feet)	Other industrial (billions of cubic feet)	Total industrial (billions of cubic feet)	Per cent of total consumption	Average value at points of consumption per M cubic feet (cents)
1917	795	429	54	2,431	258	32	30.8	[1]	[1]	[1]	537	68	11.7
1918	721	449	62	2,509	271	38	31.4	[1]	[1]	[1]	450	62	15.2
1919	746	480	64	2,501	256	34	34.6	170	50	270	490	66	14.8
1920	798	496	62	2,615	286	36	38.2	202	41	269	512	64	17.0
1921	662	465	70	2,631	248	38	44.4	182	51	181	414	62	15.5
1922	763	545	71	3,015	255	33	49.9	198	54	256	508	67	18.6
1923	1,007	876	87	3,234	277	28	51.4	343	109	278	730	72	13.4
1924	[2] 1,142	1,016	89	3,443	285	25	54.0	393	157	306	856	75	11.6
1925	[2] 1,189	1,040	88	[3] 3,508	272	23	56.0	424	140	352	916	77	12.3
1926	[2] 1,313	1,206	92	3,731	289	22	58.1	478	131	415	1,024	78	12.8

[1] Figures not available.

[2] Includes gas piped to Canada and Mexico; see p. 177.

[3] Revised figures.

LIME

By A. T. Coons [1]

SUMMARY

Sales of lime by producers in the United States in 1926 decreased less than 1 per cent in quantity but 2 per cent in value, compared with 1925. Sales of lime for use in the manufacture of chemicals increased 3 per cent in quantity. Lime for construction decreased 3 per cent in quantity, and the quantity of agricultural lime reported was very slightly less than in 1925. Many of the States showed increases and decreases in sales as compared with 1925, but in no instance was the change of any particular note. Ohio, the largest producing State, showed a decrease of 3 per cent in quantity reported; Pennsylvania, which ranks second in output, produced approximately the same quantity as in 1925. Both States showed decreased sales of building and agricultural lime and increased sales of chemical lime. The total number of plants that reported operation was 15 less than in 1925, largely because many field kilns in Pennsylvania were idle. Labor conditions at the plants seemingly changed little during 1926, and wages and cost of materials were about the same as during 1925. There was the same tendency toward lower prices as in 1925, and the average value, at the plants, of lime sold decreased from $9.30 to $9.11 a ton. The average value for the building lime was 9 cents less per ton than in 1925, for chemical lime it was 31 cents less, and for agricultural lime 13 cents more.

The accompanying tables do not include a considerable amount of lime which is not a commercial product but is burned, for use in manufacturing, from stone either quarried or purchased by the manufacturer. This stone is reported to the bureau as raw limestone and is included in the statistics on stone. It is used mainly by alkali works, carbide works, sugar refineries, and smelters.

PRODUCTION

Lime sold by producers in the United States, 1917–1926

Year	Number of plants in operation	Short tons	Value [a]	
			Total	Average
1917	595	3,786,364	$23,807,877	$6.29
1918	496	3,206,016	26,808,909	8.36
1919	539	3,330,347	29,448,553	8.84
1920	515	3,570,141	37,543,840	10.52
1921	520	2,532,153	24,895,370	9.83
1922	530	3,639,617	33,255,039	9.14
1923	467	4,076,243	39,993,652	9.81
1924	450	4,072,000	39,596,423	9.72
1925	450	4,580,823	42,609,141	9.30
1926	435	4,560,398	41,566,452	9.11

[a] The value given represents the value of bulk lime f. o. b. at point of shipment and does not include cost of barrel or package.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Lime sold by producers in the United States, 1925–26, by States

State	1925			1926		
	Number of plants in operation	Short tons	Value	Number of plants in operation	Short tons	Value
Alabama	11	207,699	$1,679,155	11	220,732	$1,721,558
Arizona	3	39,045	394,023	3	42,757	421,549
Arkansas	5	24,791	223,965	5	31,346	275,935
California	10	70,805	745,132	9	67,421	800,089
Colorado	3	(1)	(1)	4	12,470	127,975
Connecticut	6	58,449	672,821	6	61,742	695,495
Florida	3	17,793	186,650	4	9,424	100,241
Georgia	1	(1)	(1)	1	18,526	141,257
Hawaii	1	(1)	(1)	1	5,717	102,063
Idaho	1	(1)	(1)	2	(1)	(1)
Illinois	10	96,066	928,632	12	103,180	1,013,740
Indiana	7	127,878	1,067,040	7	126,005	970,624
Iowa	2	(1)	(1)	2	(1)	(1)
Kentucky	3	9,433	71,300	3	8,550	55,663
Louisiana				1	(1)	(1)
Maine	4	115,571	1,291,812	4	128,120	1,615,776
Maryland	12	64,518	524,100	10	63,639	524,242
Massachusetts	9	197,732	2,610,279	10	202,065	2,653,746
Michigan	8	95,036	909,952	8	107,671	995,123
Minnesota	3	(1)	(1)	4	28,522	296,068
Missouri	18	273,348	2,610,954	15	263,467	2,218,943
Montana	3	6,269	44,992	3	8,099	64,916
Nevada	1	(1)	(1)	1	23,162	239,469
New Jersey	2	(1)	(1)	1	(1)	(1)
New Mexico	3	1,329	14,010	3	2,032	20,479
New York	12	104,829	1,030,960	12	107,326	1,016,647
North Carolina	1	(1)	(1)	2	(1)	(1)
Ohio	33	1,089,385	10,970,605	31	1,056,589	10,348,880
Oklahoma	2	(1)	(1)	1	257	2,185
Oregon	1	(1)	(1)	2	785	13,930
Pennsylvania	142	794,951	6,425,675	133	794,196	6,303,312
Porto Rico	18	9,988	148,326	14	7,116	130,872
Rhode Island	1	(1)	(1)	1	2,857	42,535
South Dakota	2	(1)	(1)	2	(1)	(1)
Tennessee	14	175,685	1,344,508	13	173,363	1,319,303
Texas	6	74,638	698,138	6	78,293	706,153
Utah	9	22,062	265,060	10	29,953	348,509
Vermont	10	66,245	788,936	10	56,378	677,944
Virginia	30	192,429	1,491,568	31	188,696	1,453,095
Washington	6	29,636	357,297	4	23,783	298,014
West Virginia	9	270,895	1,879,223	9	267,464	1,719,590
Wisconsin	25	244,903	2,204,504	23	216,414	1,896,772
Wyoming				1	(1)	(1)
Undistributed		99,415	1,029,524		22,281	233,760
	450	4,580,823	42,609,141	435	4,560,398	41,566,452

[1] Included under "Undistributed."

Lime sold by producers in the United States, 1925–26, by uses

Use	Quantity		Value	
	Percentage of total	Short tons	Total	Average
1925				
Agricultural	6.5	298,976	$2,129,169	$7.12
Building	52.1	2,387,267	24,115,420	10.10
Chemical:				
Glass works	1.6	73,011	622,909	8.53
Metallurgy	9.0	411,190	3,007,228	7.31
Paper mills	8.2	376,670	3,174,851	8.43
Refractory lime (dead-burned dolomite)	8.6	392,147	3,730,510	9.51
Sugar refineries	.4	19,089	280,985	14.72
Tanneries	1.4	62,933	557,187	8.85
Other uses [1]	12.2	559,540	4,990,882	8.92
Total chemical	41.4	1,894,580	16,364,552	8.64
	100.0	4,580,823	42,609,141	9.30
Hydrated lime (included in above totals)		1,560,848	15,287,461	9.79

[1] Details of distribution shown in following table.

Lime sold by producers in the United States, 1925–26, by uses—Continued

Use	Quantity		Value	
	Percentage of total	Short tons	Total	Average
1926				
Agricultural	6.5	297,010	$2,153,233	$7.25
Building	50.9	2,320,323	23,227,034	10.01
Chemical:				
Glass works	1.8	84,263	713,321	8.47
Metallurgy	9.0	408,234	2,860,338	7.01
Paper mills	9.3	423,322	3,492,996	8.25
Refractory lime (dead-burned dolomite)	8.5	386,715	3,593,731	9.29
Sugar refineries	.3	15,379	238,188	15.49
Tanneries	1.5	66,536	584,296	8.78
Other uses [1]	12.2	558,616	4,703,315	8.42
Total chemical	42.6	1,943,065	16,186,185	8.33
	100.0	4,560,398	41,566,452	9.11
Hydrated lime (included in above totals)	----------	1,606,811	15,182,460	9.45

[1] Details of distribution shown in following table.

It is necessary to classify much material as "unspecified," because many of the manufacturers do not report the uses of that part of their lime which they sell for chemical purposes. This lime is known to be applied to several of the uses enumerated, but the following figures are the best available:

Chemical lime sold by producers in the United States for "other uses," 1925–26

Use	1925		1926	
	Short tons	Value	Short tons	Value
Acetic acid	6,527	$55,532	----------	----------
Alcohol manufacture and dehydration	681	5,556	3,295	$28,150
Alkali works (ammonia, soda, potash)	30,617	255,618	26,549	203,692
Bleaching powder	12,939	105,748	5,864	46,735
Bleach, liquid	5,258	49,531	9,581	99,218
Calcium acetate	10,526	90,062	7,128	56,665
Calcium carbide	16,354	140,000	22,285	177,100
Coke and gas manufacture (gas purification and plant by-products)	28,999	224,433	26,678	200,614
Creameries and dairies	2,083	42,697	2,719	43,427
Disinfectants (chloride of lime, etc.)	4,268	38,588	5,432	42,875
Flour mills	415	4,430	527	5,275
Glue	11,739	100,008	11,120	92,771
Insecticides (spraying materials)	14,019	137,564	14,558	141,108
Oil and fat manufacture	4,416	53,935	4,809	44,984
Paint (kalsomine, whitewash, varnish, etc.)	3,894	31,869	2,156	20,355
Rubber	3,569	42,302	3,542	39,727
Salt refining	1,100	8,320	1,722	14,241
Sand-lime and slag brick	25,144	210,450	39,821	388,166
Sanitation (sewage and garbage purification, etc.)	9,307	69,050	2,731	23,328
Silica brick	25,901	234,741	14,881	123,207
Soap	16,008	106,003	15,906	107,390
Textiles	1,032	11,817	1,133	11,869
Water purification	115,776	1,085,825	139,478	1,185,670
Wood distillation	2,807	27,206	12,225	101,749
Undistributed [1]	35,193	295,013	43,580	342,679
Unspecified	170,968	1,564,584	140,896	1,162,320
	559,540	4,990,882	558,616	4,703,315

[1] 1925: Lime used in acid neutralization and drying, asphalt and clay filler, baking powder, bichromate refining, buffing compounds, dyes, explosives, fertilizer filler, food products, gelatin (edible), magnesia, oil refining, poultry food, proprietary medicines, sheep dip, and tobacco. 1926: Lime used in acid neutralization and drying, artificial silk, asphalt and pottery filler, baking powder, bichromate refining, buffing compounds, corn products, cyanide manufacture, dyes, explosives, food products, gelatin (edible), magnesia, oil refining, oxygen purification, and tobacco.

Lime sold by producers in the United States in 1926, by States and uses

State	Building		Agricultural		Chemical												Total	
					Glass works		Paper mills		Sugar refineries		Tanneries		Metallurgy		Other chemical uses			
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	64,393	$545,065	(1)	(1)			(1)	(1)	(1)	(1)	(1)	(1)	101,458	$768,013	34,250	$261,441	220,732	$1,721,558
Arizona	17,972	221,797			(1)	(1)					(1)	(1)	22,172	156,948	(1)	(1)	42,757	421,549
Arkansas	14,858	149,378	(1)	(1)			(1)	(1)							(1)	(1)	31,346	275,935
California	47,406	593,371	3,513	$20,111			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	67,421	800,089
Colorado	6,270	64,725											(1)	(1)	(1)	(1)	12,470	127,975
Connecticut	55,418	647,985	(1)	(1)			(1)	(1)									61,742	695,495
Florida	9,424	100,241															9,424	100,241
Georgia	(1)	(1)	(1)	(1)													18,526	141,257
Hawaii	(1)	(1)	(1)	(1)					(1)	(1)							5,717	102,063
Idaho	(1)	(1)	(1)	(1)			(1)	(1)									(1)	(1)
Illinois	57,969	621,060					9,953	$83,184			4,835	$45,009	7,510	62,472	22,913	202,015	103,180	1,013,740
Indiana	18,065	139,397	10,311	41,099	1,911	$16,824	36,955	275,671			2,402	19,976	10,637	78,052	45,724	399,605	126,005	970,624
Iowa	(1)	(1)	(1)	(1)													(1)	(1)
Kentucky	(1)	(1)	(1)	(1)			(1)	(1)			(1)	(1)	(1)	(1)	(1)	(1)	8,550	55,663
Louisiana	(1)	(1)	(1)	(1)			(1)	(1)									(1)	(1)
Maine	73,519	1,135,920	9,327	45,456			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	128,120	1,615,776
Maryland	9,352	74,865	53,275	442,771									1,012	6,606			63,639	524,242
Massachusetts	154,259	2,172,049	4,935	23,938			22,333	211,586			(1)	(1)	(1)	(1)	19,031	233,680	202,065	2,653,746
Michigan	14,653	133,594	(1)	(1)			61,206	587,853			2,217	20,975	(1)	(1)	29,278	250,024	107,671	995,123
Minnesota	19,912	205,117					4,550	47,791					(1)	(1)	(1)	(1)	28,522	296,068
Missouri	123,057	1,096,531	500	5,030	(1)	(1)	13,824	123,224	727	$7,154	(1)	(1)	26,537	177,817	94,249	767,006	263,467	2,218,943
Montana	(1)	(1)											(1)	(1)	(1)	(1)	8,099	64,916
Nevada	(1)	(1)	(1)	(1)									(1)	(1)			23,162	239,469
New Jersey	(1)	(1)															(1)	(1)
New Mexico	882	9,554													1,150	10,925	2,032	20,479
New York	33,606	273,095	3,419	28,903	(1)	(1)	17,677	179,845	(1)	(1)	4,417	55,024	13,283	140,517	34,387	333,883	107,326	1,016,647
North Carolina	(1)	(1)	(1)	(1)							(1)	(1)					(1)	(1)
Ohio	753,538	7,429,800	23,620	150,452	79,578	672,138	22,542	164,102	(1)	(1)	(1)	(1)	9,040	69,630	168,261	1,862,659	1,056,589	10,348,880
Oklahoma	257	2,185															257	2,185
Oregon	785	13,930															785	13,930
Pennsylvania	290,704	2,401,496	128,881	978,323			63,971	522,454	301	2,209	20,666	185,267	82,260	497,612	207,413	1,715,951	794,196	6,303,312
Porto Rico	288	3,168	296	3,027					6,426	123,357					106	1,320	7,116	130,872
Rhode Island	(1)	(1)	(1)	(1)							(1)	(1)			(1)	(1)	2,857	42,535
South Dakota	(1)	(1)											(1)	(1)	(1)	(1)	(1)	(1)
Tennessee	78,531	738,118	557	3,551			51,193	275,651	(1)	(1)	3,114	21,706	(1)	(1)	34,600	242,345	173,363	1,319,303
Texas	49,734	462,133	(1)	(1)	(1)	(1)	(1)	(1)	589	5,475			(1)	(1)	15,780	148,013	78,293	706,153
Utah	13,121	164,978	(1)	(1)									(1)	(1)	(1)	(1)	29,953	348,509

Vermont	30,935	417,515	1,134	5,133			10,637	115,261			3,283	35,993	3,929	36,648	6,460	67,394	56,378	677,944
Virginia	76,082	661,641	29,746	212,537			12,564	86,181	1,000	7,000	10,018	66,680	3,352	23,472	55,934	395,584	188,696	1,453,095
Washington	18,942	238,330					(1)	(1)	(1)	(1)			(1)	(1)	(1)	(1)	23,783	298,014
West Virginia	30,220	241,337	17,761	113,218	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	68,817	318,973	138,438	955,297	267,464	1,719,590
Wisconsin	201,836	1,717,862	(1)	(1)			8,409	76,345			(1)	(1)	(1)	(1)	4,358	86,942	216,414	1,896,772
Wyoming	(1)	(1)															(1)	(1)
Undistributed	54,335	550,797	9,735	79,684	2,774	24,359	87,517	743,848	6,336	92,993	15,584	133,660	58,227	523,578	32,999	362,962	22,281	223,760
	2,320,323	23,227,034	297,010	2,153,233	84,263	713,321	423,322	3,492,996	15,379	238,188	66,536	584,296	408,234	2,860,338	945,331	8,297,046	4,560,398	41,566,452

[1] Included under "Undistributed."

BUILDING LIME

Demand for building lime differed greatly in the different States. Competition was very keen. Of the chief States producing lime for construction, Alabama, Illinois, Maine, Massachusetts, and Missouri showed sales that were more than in 1925. Ohio and Pennsylvania are the largest producers of lime for construction, but the sales for this purpose from these States decreased 4 and 7½ per cent, respectively, in 1926. About two-thirds of the lime sold from Pennsylvania for this purpose was quicklime, whereas 96 per cent of the building lime furnished by Ohio was hydrated lime, a part of which was high-grade finishing lime. The sales from Ohio, according to grades of lime, are given in the following table:

Lime sold by Ohio producers for construction, 1924–1926

	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Quicklime	33,675	$282,171	34,601	$274,853	26,735	$209,460
Hydrated lime	637,835	6,609,598	750,845	7,662,264	726,803	7,220,340
	671,510	6,891,769	785,446	7,937,117	753,538	7,429,800

Of the hydrated lime sold by producers in the United States in 1926 Ohio produced 752,764 tons, or 47 per cent. Of this total 726,803 tons (97 per cent) was sold for construction and was widely distributed throughout the continental United States. Figures of distribution, as reported to the Bureau of Mines, presented for blocks of contiguous States roughly comprising various freight-rate zones are given in the next table. It is possible that some of the lime reported as supplied to the district including Ohio is reshipped by dealers.

Shipments of hydrated lime from plants in the United States and in Ohio, 1925–26 [1]

Destination	1925				
	From all plants		From Ohio plants		
	Short tons	Distribution (per cent)	Short tons	Distribution (per cent)	Group total (per cent)
Illinois, Indiana, Michigan, Ohio	450,555	29.0	365,249	47.0	81.1
Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, West Virginia	613,701	39.5	261,273	33.6	42.6
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	54,819	3.5	21,717	2.8	39.6
Florida, Georgia, North Carolina, South Carolina, Virginia	172,432	11.1	71,395	9.2	41.4
Alabama, Kentucky, Louisiana, Mississippi, Tennessee	68,271	4.4	22,833	2.9	33.4
Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, Texas, Wisconsin	141,286	9.1	33,496	4.3	23.7
Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming	51,915	3.4	1,301	.2	2.5
	1,552,979	100.0	777,264	100.0	50.0

[1] Figures cover over 99 per cent of total shipments of hydrated lime.

Shipments of hydrated lime from plants in the United States and in Ohio, 1925–26—Continued

Destination	1926				
	From all plants		From Ohio plants		
	Short tons	Distribution (per cent)	Short tons	Distribution (per cent)	Group total (per cent)
Illinois, Indiana, Michigan, Ohio	449,503	28.1	349,777	46.6	77.8
Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, West Virginia	628,398	39.3	258,126	34.4	41.1
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	67,709	4.2	20,963	2.8	31.0
Florida, Georgia, North Carolina, South Carolina, Virginia	172,082	10.8	61,771	8.3	35.9
Alabama, Kentucky, Louisiana, Mississippi, Tennessee	72,254	4.5	21,204	2.8	29.3
Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, Texas, Wisconsin	167,265	10.5	34,730	4.6	20.8
Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming	41,348	2.6	3,461	.5	8.4
	1,598,559	100.0	750,032	100.0	46.9

CHEMICAL LIME

Sales of chemical lime by producers in 1926 increased 3 per cent in quantity but decreased 1 per cent in value. Sales for some of the chief chemical activities increased as did those for some of the minor uses, reported sales for which are apt to vary on account of incompleteness of classification. (See tables, pp. 184 and 185.)

AGRICULTURAL LIME

From 1914 through 1923, with the exception of the year 1919, there was a steady decrease in sales of agricultural lime. In 1924 there was an increase of 3 per cent in the quantity as compared with 1923 and in 1925 an increase of 20 per cent over 1924. In 1926 the lime reported sold for this purpose was very slightly less than in 1925, but the value increased somewhat. Sales of pulverized limestone for agricultural purposes, which had increased 6 per cent in quantity in 1924 and 44 per cent in 1925, decreased 5 per cent in 1926. The demand for both lime and stone was reported as good, but weather conditions in many sections prevented application to the soil. Sales of calcareous marl, of which all but a negligible quantity sold as a filler was used for agriculture, decreased 20 per cent in quantity in 1926, and there was also a decrease in the quantity of lime reported burned from oyster shells.

The table following gives available data on the quantity and value of different kinds of agricultural lime sold by producers in 1925 and 1926. The method by which the effective lime content of the different forms of land lime is calculated was set forth in Mineral Resources for 1921.

Agricultural lime sold by producers in the United States, 1925–26, by kinds

Kind	Short tons		Value	
	Gross	Effective lime content	Total	Average
1925				
Lime from limestone:				
Quicklime	132,011	110,800	$744,518	$5.64
Hydrated	166,965	116,900	1,384,651	8.29
Lime from oyster shells	12,547	10,500	106,087	8.46
Limestone (pulverized)	1,954,480	840,400	2,880,589	1.47
Calcareous marl	68,670	29,500	187,839	2.74
1926				
Lime from limestone:				
Quicklime	112,717	94,600	687,661	6.10
Hydrated	184,293	129,000	1,465,572	7.95
Lime from oyster shells	11,984	10,000	77,428	6.46
Limestone (pulverized)	1,850,620	796,000	3,064,235	1.66
Calcareous marl	55,060	23,700	146,094	2.65

Figures covering the calcareous marl used for the manufacture of cement are given in the chapter on cement. The figures in the foregoing table represent the output of fresh-water marl, produced chiefly in Virginia (23,927 short tons in 1926, valued at $48,943) and West Virginia. Other productive States in 1926 were California, Illinois, Maine, Maryland, North Carolina, Ohio, and South Carolina.

HYDRATED LIME

The statistics of the output of hydrated lime include only the product made in hydrating machines and omit hand-slaked lime. In 1926 there was an increase of 3 per cent in the quantity but a decrease of less than 1 per cent in the value of hydrated lime sold by producers. Increased sales of hydrated lime were reported for agriculture and for chemicals but decreased sales for construction.

Thirteen more plants than in 1925 reported the manufacture of hydrated lime in 1926. The average value per ton decreased 34 cents in 1926. Ohio and Pennsylvania are the largest producers of hydrated lime; in 1926 they produced 47 and 15 per cent, respectively, of the total output. Details of the distribution of hydrated lime from Ohio, by approximate freight-rate zones, are given on pages 188 and 189.

Hydrated lime sold by producers in the United States, 1917–1926

Year	Number of plants in operation	Short tons	Value	
			Total	Average
1917	90	709,157	$4,643,004	$6.55
1918	90	620,216	5,342,113	8.61
1919	93	777,408	7,061,146	9.08
1920	98	853,116	9,287,562	10.89
1921	105	792,970	7,421,637	9.36
1922	114	1,106,063	9,868,980	8.92
1923	121	1,225,928	12,229,598	9.98
1924	120	1,316,664	13,199,846	10.03
1925	134	1,560,848	15,287,461	9.79
1926	147	1,606,811	15,182,460	9.45

Hydrated lime sold by producers in the United States, 1925–26, by States

State	1925		1926	
	Short tons	Value	Short tons	Value
Alabama	25,989	$229,076	29,791	$256,818
California	8,715	113,356	9,294	122,135
Florida	(1)	(1)	6,017	63,008
Georgia	(1)	(1)	17,705	135,780
Hawaii	(1)	(1)	3,888	68,813
Illinois	(1)	(1)	26,549	254,304
Indiana	43,815	410,319	46,332	398,682
Maryland	33,768	307,805	36,624	316,013
Massachusetts	(1)	(1)	19,005	164,058
Michigan	(1)	(1)	15,468	183,566
Missouri	71,290	750,710	83,451	790,531
Nevada	(1)	(1)	3,091	44,865
New York	32,129	291,421	36,193	311,613
Ohio	779,286	7,877,738	752,764	7,399,770
Pennsylvania	219,737	2,020,337	237,066	2,061,741
Rhode Island	(1)	(1)	593	5,337
Tennessee	48,364	454,957	52,190	464,494
Texas	29,529	281,824	33,443	318,981
Vermont	(1)	(1)	9,731	90,732
Virginia	52,374	440,734	62,191	531,023
West Virginia	51,608	384,898	42,164	307,227
Wisconsin	18,650	204,244	15,458	171,322
Undistributed [2]	145,594	1,520,042	67,803	721,647
	1,560,848	15,287,461	1,606,811	15,182,460

[1] Included under "Undistributed."
[2] 1925: Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Hawaii, Illinois, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Montana, Nevada, Rhode Island, Utah, Vermont, and Washington. 1926: Arizona, Arkansas, Colorado, Connecticut, Kentucky, Maine, Minnesota, Montana, New Jersey, North Carolina, Utah, and Washington.

Hydrated lime sold by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Short tons	Value	Short tons	Value
Agricultural	166,965	$1,384,651	184,293	$1,465,572
Building	1,194,571	11,872,556	1,189,239	11,463,100
Chemical:				
Glass works	1,581	16,978	3,626	34,304
Metallurgy	9,826	103,555	7,638	75,324
Paper mills	28,126	316,172	32,867	340,698
Sugar refineries	5,670	77,154	5,939	87,276
Tanneries	22,526	210,258	24,037	219,016
Other uses	131,583	1,306,137	159,172	1,497,170
Total chemical	199,312	2,030,254	233,279	2,253,788
	1,560,848	15,287,461	1,606,811	15,182,460

EXPORTS AND IMPORTS

Lime exported from the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	18,794	$168,671	1922	8,289	$116,649
1918	7,191	105,803	1923	11,789	170,289
1919	6,372	108,370	1924	14,905	212,340
1920	5,921	128,296	1925	14,800	218,696
1921	5,192	109,769	1926	12,960	191,768

Lime exported from the United States, 1925-26, by countries

Country	1925		1926	
	Short tons	Value	Short tons	Value
North America:				
Canada	6,584	$78,634	6,129	$75,550
Central America—				
British Honduras	(1)	7	(1)	2
Costa Rica	(1)	7	6	132
Guatemala			90	2,035
Honduras	320	4,392	159	3,016
Nicaragua	100	3,543	91	2,947
Panama	116	2,614	285	6,146
Salvador	2	55	2	50
Mexico	3,088	30,090	2,902	25,951
Newfoundland and Labrador	8	255	1	44
West Indies—				
British—				
Jamaica	20	506	64	1,826
Trinidad and Tobago			6	99
Other British	42	887	74	1,533
Cuba	1,166	23,838	310	5,286
Dominican Republic	1,212	25,150	1,163	19,248
Virgin Islands of the United States	129	3,544	61	1,749
South America:				
Argentina			5	117
Brazil	1	33		
Chile	133	3,323	17	224
Colombia	145	3,734	193	5,697
Ecuador	(1)	14		
Guiana—				
British			2	95
Dutch	(1)	17	23	667
Peru	508	12,575	548	11,137
Venezuela	23	351	10	287
Europe:				
Netherlands	183	2,600	112	11,257
Sweden	21	851	24	950
United Kingdom	37	921	2	100
Asia:				
China	1	50		
Japan, including Chosen	140	4,049	62	3,037
Philippine Islands	794	15,899	615	12,460
Africa, British South	(1)	28		
Oceania:				
Australia	15	468	3	98
French Oceania	1	40	1	25
New Zealand	11	207		
Other	(1)	14	(1)	3
	14,800	218,696	12,960	191,768

[1] Less than 1 ton.

Lime imported for consumption in the United States, 1917–1926 [1]

Year	Short tons	Value	Year	Short tons	Value
1917	7,353	$70,505	1922	14,112	$290,845
1918	6,650	73,458	1923	25,407	428,903
1919	8,679	128,519	1924	20,480	377,994
1920	22,688	392,137	1925	15,323	285,599
1921	10,811	234,798	1926	18,702	346,969

[1] Most of the lime imported into the United States comes from Canada.

SHIPMENTS

Shipments of lime, as reported to the Bureau of Mines by the producers, have been combined to show the movement of this product to destinations in State groups which approximately comprise various freight-rate zones. The results of the compilation for the years 1925 and 1926 are given in the following table:

Lime shipped in the United States, 1925–26, by destinations, in short tons

Destination	1925			1926		
	Hydrated lime	Quicklime	Total	Hydrated lime	Quicklime	Total
Illinois, Indiana, Michigan, Ohio	450,555	714,223	1,164,778	449,503	697,928	1,147,431
Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, West Virginia	613,701	1,094,206	1,707,907	628,398	1,046,206	1,674,604
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	54,819	262,707	317,526	67,709	234,995	302,704
Florida, Georgia, North Carolina, South Carolina, Virginia	172,432	154,149	326,581	172,082	142,532	314,614
Alabama, Kentucky, Louisiana, Mississippi, Tennessee	68,271	279,713	347,984	72,254	289,778	362,032
Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, Texas, Wisconsin	141,286	301,249	442,535	167,265	286,780	454,045
Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming	51,915	196,149	248,064	41,348	195,653	237,001
Undistributed	7,869	17,579	25,448	8,252	59,715	67,967
	1,560,848	3,019,975	4,580,823	1,606,811	2,953,587	4,560,398

ASBESTOS

By B. H. Stoddard

INTRODUCTION

During 1926 the asbestos mining industry in the United States was characterized by much larger sales of chrysotile asbestos, all of which came from Arizona. Sales of the anthophyllite variety declined. Market conditions were fairly satisfactory. Prices of the raw material were firmer, some of the better grades selling at higher prices. Grading of the product showed improvement—a condition that reflected the successful operation of the Canadian asbestos merger, which went into effect January 1, 1926, and controls the asbestos market in the United States.

The United States is the largest manufacturer and consumer of asbestos products in the world, but the asbestos comes almost entirely from Canada, whose production is wholly chrysotile. Other varieties of asbestos used, though not mined, in the United States are crocidolite, a soda-bearing amphibole often called blue asbestos, mined in Rhodesia, British South Africa, and amosite, a variety of anthophyllite (amphibole) mined in the Transvaal, Union of South Africa, that contains iron in place of the magnesia of the more common variety.

Tremolite and actinolite are also asbestiform minerals, but they are not of much commercial importance because their fibers, although they may be long and silky, are not strong. Tremolite is chemically so stable that when pure it may be used for making chemical filters. Actinolite is mined for industrial use in the Province of Ontario, Canada, and when ground and mixed with other ingredients is used as a roofing compound that is said to be a nonconductor of heat and very resistant to the weather.

Asbestos is a term applied to any mineral that can be readily separated into flexible fibers. The asbestos commercially mined in the United States is of two varieties—chrysotile, a form of serpentine, and anthophyllite, which belongs to the amphibole group. Chrysotile asbestos is mostly green, rarely yellowish in color; fiber of good quality has a silky luster and sufficient toughness to give it considerable tensile strength, so that it can be spun and woven. It occurs in veins as cross fiber and as slip fiber. Anthophyllite asbestos generally has a dull luster, is grayish, brownish, or greenish in color, and, though flexible, for the most part is rather brittle. It occurs in veins as slip fiber and in rock as mass fiber.

Cross-fiber asbestos lies perpendicular, or nearly perpendicular, to the walls of the vein. Slip-fiber asbestos lies parallel to the walls of the vein. Mass-fiber asbestos is rock wholly made up of irregularly arranged bundles of fibrous amphibole.

Mining methods vary according to the geological occurrence of the asbestos. Asbestos in peridotite or large masses of serpentine is

generally mined by open pit, as in Canada. The asbestos in limestone, such as the deposits in Arizona, is usually mined by tunnels and lateral drifts, or by some simple system of underground mining following the ore. In the Arizona field the ore is first blocked out and then stoped, the roof, after stoping, being upheld by the waste rock. In this field it is common practice to keep the roof close to the asbestos zone and to pick down the ore onto a large canvas after the supporting rock has been removed.

PRODUCTION

The total quantity of asbestos sold by producers in the United States in 1926 was 1,358 short tons, valued at $134,731. These figures represent chrysotile asbestos mined in Arizona and amphibole asbestos mined in Georgia and Maryland. The Bureau of Mines is not at liberty to give the statistics separately for chrysotile and amphibole asbestos as in previous years.

Asbestos sold by producers in the United States, 1917–1926, by varieties

Year	Chrysotile		Amphibole		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	1,391	$279,270	567	$11,744	1,958	$291,014
1918	392	101,059	606	17,628	998	118,687
1919	502	229,265	659	19,000	1,161	248,265
1920	1,245	661,907	403	16,324	1,648	678,231
1921	438	313,268	393	23,700	831	336,968
1922	25	3,320	42	6,800	67	10,120
1923	69	4,433	158	5,193	227	9,626
1924	173	33,941	127	8,585	300	42,526
1925	93	40,750	1,165	10,950	1,258	51,700
1926	(1)	(1)	(1)	(1)	1,358	134,731

[1] Bureau of Mines not at liberty to publish figures.

In the United States deposits of chrysotile asbestos of possible commercial value have been found in Arizona, California, Montana, Vermont, and Wyoming, but in 1926 chrysotile asbestos was commercially produced in Arizona only. Deposits of mass-fiber anthophyllite (amphibole) have been worked in Georgia, Idaho, and North Carolina, but in 1926 commercial production was made in Georgia only. Slip-fiber anthophyllite (amphibole) has been mined in California and Maryland, but in 1926 Maryland was the only producer of this variety.

Following is a list of producers of asbestos making sales in the United States in 1926:

Producers of asbestos making sales in the United States in 1926

Name	Address	Location of property
L. M. Arnold	Statham, Ga.	1¼ miles northeast from Hollywood, Ga.
Arizona Asbestos Association (subsidiary of Johns-Manville Co.).	Globe, Ariz.	Chrysotile, on Ash Creek, Gila County, Ariz.
Abb Landis (Hollywood Asbestos Mines).	1110 Independent Life Building, Nashville, Tenn.	½ mile from Hollywood, Ga.
Powhatan Mining Corporation	214 Equitable Building, Baltimore, Md.	1 mile northwest from Pylesville, Md.
Regal Asbestos Mines (Inc.)	220 Broadway, New York, N. Y.	Gila County, Ariz.; nearest post office, Rice, Ariz.
San Carlos Asbestos Mining Co. (Inc.).	Snowflake, Ariz.	Near top of Salt River Canyon, Gila County, Ariz.

REVIEW BY STATES

Arizona.—During 1926 asbestos mining was conducted by the Arizona Asbestos Association (subsidiary of Johns-Manville Co.) at Chrysotile, which reported no new development work during the year; by the Regal Asbestos Mines (Inc.) (E. Schaaf-Regelman), nearest post office, Rice, Ariz., which reported several hundred feet of new development work; and by the San Carlos Asbestos Mining Co. (Inc.), Snowflake, Ariz., which owns the Horse Shoe group on the Fort Apache Indian Reservation. Assessment work was done at all the other claims. The International Asbestos Co. (Inc.) completed a 100-ton mill on its property and expects to be producing in the near future. The Riga Asbestos Mining Co., whose property is 45 miles north of Globe, on Reynolds Creek, reported that it had opened up a very good grade of fiber and expected to install milling machinery for grading. The Triangle Asbestos Association, Young, Ariz., which did assessment work only, reported that it had incorporated and expected to start work in a short time. The company is planning to erect a fiberizing plant.

California.—No sales of asbestos were made from California, but holders of claims did assessment work. The property of the San Benito Asbestos Co. (California Asbestos Mining Co.) was leased for a short time to the Sall Mountain Co., of Chicago, Ill., which reported that it took out several hundred tons, but made no shipments.

Georgia.—Although sales of mass-fiber anthophyllite in Georgia were not as large as in 1925, activities in this field were not slackened. The Hollywood Asbestos Mines, at Hollywood, owned by Abb Landis, who acquired the property in November, 1926, from the Asbestos Mining & Manufacturing Co., produced short fiber amphibole in several grades of white, buff, and red. The product is said to possess high heat and acid resistance, and is used in the building trade for plaster, stucco, and flooring, and as prepared cement for boiler and pipe coverings, and in the manufacture of composition battery boxes.

Maryland.—The Powhatan Mining Corporation worked, as usual, the Jenkins asbestos mine in Harford County near Pylesville, which produces a high-grade slip-fiber anthophyllite that is used for making chemical filters. New equipment at this mine consisted of a derrick with clamshell bucket.

Montana.—In 1926 the Badger-Montana Mining Co., 15 Sycamore Street, Milwaukee, Wis., leased its property 4 miles from Southern Cross, Mont., but no output was made. It is expected, however, that work will be resumed by either the owner or the lessees as soon as finances will permit. The Idaho-Montana Asbestos Co., whose property is 36 miles from West Yellowstone, reported the delivery of additional machinery but made no production.

Oregon.—L. B. Larson, Telocaset, Oreg., reported that the property 20 miles south of Baker, Baker County, of which he is part owner, is developed with a 310-foot tunnel, several shafts, and open cuts. New development consists of a 16-foot shaft and several open cuts. Samples of several grades of material were sent to eastern firms, but no sales were made. Mr. Larson said that the property would probably be in operation in another year.

PRICES

In 1926 prices per short ton of Canadian chrysotile asbestos (f. o. b. Quebec), which control domestic prices, were reported during the year by the Engineering and Mining Journal, as follows:

Monthly prices per short ton of Canadian chrysotile asbestos, f. o. b. Quebec, in 1926

Grade	January	February	March	April	May	June
Crude No. 1	$475	$500–$525	$525	$525	$525	$525
Crude No. 2	275–300	300–325	300	300	300	300
Spinning fibers	175–200	175–190	190	190	190	190
Magnesia and compressed sheet fibers	125	125–150	125–150	125–150	125–150	125–150
Shingle stock	70	70	70	70	70	70
Paper stock	40–45	40–45	40–45	40–45	40–45	40–45
Cement stock	25	25	25	25	25	25
Floats		15		15	15	15
Short fibers	12–15	10–17.50	10–17.50	10–17.50	10–17.50	10–17.50

Grade	July	August	September	October	November	December
Crude No. 1	$525	$525	$525	$525	$525	$525
Crude No. 2	300	300	300	300	300	300
Spinning fibers	190	190	190	190	190	190
Magnesia and compressed sheet fibers	125–150	125–150	125–150	125–150	125–150	125–150
Shingle stock	70	70	70	70	70	80
Paper stock	40–45	40–45	40–45	40–45	40–45	40–45
Cement stock	25	25	25	25	25	25
Floats	15	15	15	15	15	15
Short fibers	10–17.50	10–17.50	10–17.50	10–17.50	10–17.50	10–17.50

USES

Asbestos is one of the most important fireproofing materials known, and it is largely from the best chrysotile that heat and fire resistant textile products are made. Asbestos yarn is spun and woven into incombustible cloth, which is made into curtains and scenery for theaters and other amusement places. Asbestos cloth covered with rubber cement is made into gaskets—a use that consumes a considerable part of the production of crude asbestos. Consumption of asbestos in brake linings increased. The highest grades of crude asbestos are used for these purposes. Asbestos cloth is made into linings of various kinds, blankets, mattresses for insulation, fireproof suits used by firemen and others; into aprons, gloves, mittens, leggings, and helmets, braided and woven tapes, woven sheet packing, wick and rope, clutch facings, and listings; is used for filtering purposes, in laundries on mangles, and is employed in many other ways.

In respect to quantity consumed the chief use is probably in the manufacture of paper goods for building purposes, millboard, and asbestos shingles. Short-length fiber, whose production far exceeds that of "crude" asbestos, is used for these purposes. Asbestos paper and millboard are used for heat and electric insulation in various ways. Asbestos sheeting paper is used between floors on account of its fire-resisting qualities; as a lining for stoves, heaters, filing cabinets, soldiers' helmets, mufflers of automobiles, drum controllers in sulphite mills, and automobile radiator covers; for filtration purposes; in the manufacture of tubes in the electrical industry, and of papers used for chemical purposes, and in many other ways.

Millboard is used for making fireproof wall board, as a joint packing for steam pipes, etc., as a lining for safes, stoves, and heaters, electric switch boxes, garages, washers, hoods of automobiles, and ovens. The use of asbestos shingles, composed of asbestos fiber and Portland cement, is increasing, as is the demand for asbestos cement materials, especially roofing tile. The use of asbestos in electric arc and oxyacetylene welding has made rapid advances and is common in repair shops of industrial plants.

All the uses of asbestos can not be given here. Uses other than those mentioned are as an ingredient in fireproof paints, for making asbestos washers, for covering hose, and in the manufacture of gas burners and of boots and shoes.

IMPORTS AND EXPORTS [1]

Asbestos (unmanufactured) imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	134,088	$4,521,172	708	$116,580
1918	137,700	6,337,608	697	51,053
1919	135,270	7,369,685	1,119	157,416
1920	167,558	9,120,253	615	141,071
1921	72,463	2,948,302	520	101,600
1922	149,427	5,144,700	376	49,939
1923	212,420	7,445,143	680	48,525
1924	183,250	5,602,945	1,270	93,163
1925	230,520	7,134,302	1,109	70,846
1926	257,621	8,142,505	1,104	85,922

Asbestos (unmanufactured) imported into the United States, 1925–26, by countries

Country	1925		1926	
	Short tons	Value	Short tons	Value
Africa:				
British—				
East			10	$2,106
South	421	$37,888	2,405	317,816
West	185	12,462		
Portuguese—				
East [a]	3,114	574,448	1,754	328,849
Other	65	11,705		
Canada	225,938	6,355,339	252,488	7,317,501
Colombia			36	472
France			1	24
Germany	191	35,631	349	65,424
India, British	1	25		
Italy	[b]	88	1	372
Japan	[b]	3		
Netherlands			28	1,050
United Kingdom	605	106,713	549	108,891
	230,520	7,134,302	257,621	8,142,505

[a] Recorded as Mozambique for 1926.

[b] Less than 1 ton.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

In the foregoing table the countries given are merely the countries from which asbestos was last shipped as shown by the invoices or manifests from which the records of imports were compiled. It is probable that British South Africa (Rhodesia and the Union of South Africa) was the actual source of all imports except those credited to Canada and Italy.

The exports of manufactured asbestos in 1925 and 1926 were as follows:

Manufactured asbestos products exported from the United States, 1925–26, by grades

Grade	1925		1926	
	Quantity	Value	Quantity	Value
Brake and clutch lining short tons			760	$1,040,425
Paper, millboard, and roll board do	1,080	$119,311	896	153,046
Pipe covering and cement do	2,277	280,082	2,133	257,128
Textile yarn and packing do	685	803,037	725	813,993
Magnesia and manufactures do	2,632	316,978	3,290	323,386
Asbestos roofing squares	79,170	521,766	94,642	558,720
Other manufactures, except roofing short tons	1,089	342,151	1,361	335,116

WORLD'S PRODUCTION

World's production of asbestos, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country[1]	1922	1923	1924	1925	1926
Africa:					
Rhodesia, Southern	12,926	18,474	23,715	31,161	30,249
Union of South Africa	3,981	7,614	6,569	9,224	12,789
Australia:					
New South Wales	570	207			5
South Australia		7	4		
Western Australia	184	117	75	51	107
Canada[2]	109,128	164,014	150,768	131,710	130,156
China[3]	197	[4] 128	127	216	([5])
Cyprus[3]	2,322	2,186	4,442	3,255	6,627
Finland	785	([5])	([5])	1,347	1,674
France	610	664	882	2,201	([5])
India, British	246	251	127	16	([5])
Italy	540	1,538	2,160	2,105	2,900
Japan	933	826	621	1,174	([5])
Russia	3,215	7,153	[6] 8,454	[6] 12,329	([5])
Spain	5				
United States	61	206	272	1,141	1,232

[1] In addition to the countries listed, Bolivia and Madagascar are reported to produce small quantities of asbestos. Statistics of production are not available, but the exports reported are considerably less than a quarter of a ton.

[2] Exclusive of by-products (fillers and other short fibers, sand, and gravel), the production of which is reported as follows: 1922, 39,382 tons; 1923, 45,982 tons; 1924, 54,023 tons; 1925, 131,726 tons; 1926, 137,530 tons.

[3] Exports.

[4] A production of 7,068 metric tons is reported for China in 1923. (Imp. Min. Res. Bur., London.)

[5] Data not available.

[6] Year ended Sept. 30.

Asbestos shipped from mines in British South Africa, 1917-1926, in metric tons

Year	Southern Rhodesia	Transvaal	Cape Colony	Natal
1917	8,674	2,897	2,721	25
1918	7,778	844	2,485	4
1919	8,889	572	2,906	89
1920	17,076	3,212	3,199	41
1921	17,716	1,445	3,145	56
1922	12,926	1,263	2,713	5
1923	18,474	3,698	3,916	----
1924	23,715	3,846	2,723	----
1925	31,161	6,920	2,304	----
1926	30,249	9,166	3,623	----

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TALC AND SOAPSTONE

By B. H. Stoddard[1]

INTRODUCTION

The talc and soapstone mining industry in 1926 remained virtually the same as in 1925. The total quantity of talc sold by producers was slightly less than in 1925, but the total value increased 5 per cent. The decline in sales was probably due, in part at least, to the use of substitutes, mainly clay and slate flour. Lack of prescribed methods for grading talc and insufficient knowledge concerning its physical and chemical properties as applied to the different uses helped to keep the industry from advancing. New York held first place, as usual, in the total quantity of talc sold; Vermont was second, and California third. The remainder of the output was produced by Georgia, Maryland, New Jersey, North Carolina, Pennsylvania, and Virginia.

Talc is a definite mineral. Soapstone, as the term is generally used, is only an impure massive form. Talc is a crystalline, hydrous silicate of magnesium, which, when pure, has the following chemical composition: Water, 4.8 per cent; magnesia, 31.7 per cent; silica, 63.5 per cent. It is exceedingly soft and occurs in nature most commonly as platy masses. Some talc has a fibrous structure, inherited from minerals from which it has been derived or which it has replaced. The color ranges from apple green to white. The most distinctive physical characteristics of talc are its color, its softness (it is easily scratched with the finger nail), and its greasy, soapy feel. The qualities that among others make it useful are low electrical conductivity, resistance to the action of heat, and insolubility in ordinary acids. The term "soapstone" is sometimes improperly applied to talc on account of its soapy feel. Soapstone is ordinarily a dark bluish-gray, greenish rock which contains besides talc, the principal constituent, other minerals in variable numbers and proportions.

Talc, which commonly occurs in small veins, is usually mined under ground, but where it is produced on a small scale it is mined by open cuts. The usual method of underground mining is to run an incline on the dip and to stope from levels, as the talc generally occurs in the form of an inclined layer or sheet. Large pillars are necessary for proper support because talc is slippery. After it is mined, the talc is sorted according to grade, all material suitable for cutting and carving is taken out, and the remainder is ground. Several color grades of talc may be taken from the same mine, or one grade only may be obtained from a mine. As the color of the product is an

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

important factor in determining the grade, all off-color material is rejected. Milling consists of drying, crushing, grinding, and grading.

Soapstone is quarried in blocks by channelling and undercutting. The blocks are hoisted and conveyed by cranes and cars to yards and kilns where they are examined and graded, according to quality and character, into several classes adapted for specific purposes. The graded blocks go to the block yard, and thence to gang saws which cut them into large slabs of various prescribed thicknesses. At the mill these slabs are cut to size, given a suitable surface finish, and are machined, tongued, grooved, slotted, turned, threaded or bored, and otherwise shaped for the intended use.

PRODUCTION

The total quantity of talc sold by producers in the United States in 1926 was 181,568 short tons, valued at $2,110,994. The figures for 1926 comprise 5,988 tons of crude talc, valued at $26,723; 1,528 tons of sawed and manufactured talc, valued at $130,253; and 174,052 tons of ground talc, valued at $1,954,018. There were 22 producers of talc operating 23 talc mines in 1926.

Crude talc, other than refractory grade, was sold in California, Maryland, Vermont, and Virginia. Crude (refractory grade) was mined and sold in Maryland only. Other high-grade massive talc was mined and sold in Georgia, North Carolina, and Vermont.

Most of the crude talc sold (other than refractory grade) is eventually ground; massive talc suitable for refractory purposes, which must be very fine grained, is manufactured into "lava" tips for gas burners; other high-grade massive talc is used chiefly in the manufacture of pencils, tailors' chalk, metal-workers' crayons, and in electric insulation. As the foregoing figures show, by far the larger part of the talc mined in the United States is used in the ground form as a filler in paper, paint, and rubber-goods manufacture, in toilet preparations, for electric insulation, as a lubricant, as a bleaching, cleaning, and polishing agent, for acid proofing and fireproofing, and in many other ways.

In 1926 soapstone was mined, manufactured, and sold in North Carolina and Virginia, but the Bureau of Mines is not at liberty to publish the figures.

Massive soapstone is marketed only in the manufactured form, there being little, if any, demand for crude soapstone. Much of the Virginia soapstone, however, is suitable for grinding, and when ground it usually is classed commercially as talc; it is of rather low grade and is best suited for foundry facings, rubber manufacture, for making concrete, as a lubricant, and for use in roofing compounds.

Massive high-grade soapstone is cut into slate pencils and metal-workers' crayons, but by far the larger quantity is manufactured into laundry tubs and sinks; it is used also in chemical laboratories in the form of tables, hoods, sinks, and tanks.

Talc and soapstone sold by producers in the United States, 1917–1926, by classes

Year	Crude		Sawed and manufactured				Ground		Total	
			Talc		Soapstone					
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	12,619	$69,140	5,781	$176,404	19,885	$402,506	180,563	$1,644,828	218,848	$2,292,878
1918	17,633	193,278	1,075	116,952	12,330	501,059	177,269	1,869,730	208,307	2,681,019
1919	15,625	73,437	921	147,339	16,504	530,163	151,793	1,601,736	184,843	2,352,675
1920	11,008	43,820	1,415	139,335	19,707	709,400	178,505	2,142,894	210,635	3,035,449
1921	2,150	12,911	(1)	(1)	[1]17,423	[1]627,826	102,413	1,115,205	121,986	1,755,942
1922	4,981	22,582	654	86,333	22,700	712,144	170,349	2,038,838	198,684	2,859,897
1923	5,706	50,125	682	114,772	22,857	932,098	167,447	1,915,258	196,692	3,012,253
1924	5,710	22,247	846	109,405	25,630	1,288,885	171,635	2,095,019	203,821	3,515,556
1925 [2]	5,684	24,533	895	107,691	(3)	(3)	175,677	1,879,569	182,256	2,011,793
1926 [2]	5,988	26,723	1,528	130,253	(3)	(3)	174,052	1,954,018	181,568	2,110,994

[1] Talc included under "Soapstone."
[2] Figures represent talc only.
[3] Bureau of Mines not at liberty to publish figures for soapstone.

Talc sold by producers in the United States, 1924–1926, by States

State	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
California	16,335	$247,799	14,883	$194,975	15,419	$233,292
Georgia	1,885	30,548	5,022	76,028	4,220	89,600
Maryland	3,015	29,767	2,718	35,488	2,857	41,780
New Jersey and Pennsylvania	8,281	83,296	9,206	90,502	8,097	74,120
New York	78,340	1,162,488	85,109	993,913	83,231	1,030,075
North Carolina	(1)	(1)	(1)	(1)	(1)	(1)
Vermont	61,653	573,747	54,883	533,603	53,510	514,527
Virginia	(1)	(1)	(1)	(1)	(1)	(1)
Undistributed	8,682	99,026	10,435	87,284	14,234	128,200
	178,191	2,226,671	182,256	2,011,793	181,568	2,110,994

[1] Included under "Undistributed."

The separation of the quantities and values for talc sold by producers, in accordance with the quality of the talc and the demand for the different uses, which in turn determine the manner of preparation for the market, is given in the table that follows. In 1924, 1925, and again in 1926, 3 per cent was sold rough (crude) as it came from the mine, less than 1 per cent was sold as cut pencils and crayons and as blanks used for refractory purposes, and 96 per cent was ground to talc powder.

Talc sold by producers in the United States, 1924–1926, by classes

Form in which sold	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Rough (crude)	5,710	$22,247	5,684	$24,533	5,988	$26,723
Sawed and manufactured [1]	846	109,405	895	107,691	1,528	130,253
Ground [2]	171,635	2,095,019	175,677	1,879,569	174,052	1,954,018
	178,191	2,226,671	182,256	2,011,793	181,568	2,110,994

[1] For slate pencils and metal-workers' crayons and for blanks used in making acetylene burners and other objects.
[2] For filler in paper, paint, and rubber goods, and for toilet powder, foundry facings, textiles, lubricators, electric insulation etc.

LIST OF PRODUCERS

Producers of talc and soapstone in the United States in 1926

Name and address	Location of mine
CALIFORNIA	
Ganim Gold Mines Co., Redding	2 miles west of Schilling, Shasta County.
W. S. McLean, 639 Brannan Street, San Francisco	Butte County and near Latrobe, Eldorado County.
Master Minerals Co., 1901–1929 East Slausen Avenue, Los Angeles.	Acme, San Bernardino County.
Pacific Coast Talc Co., 2149 Bay Street, Los Angeles	7 miles north of Silver Lake station, San Bernardino County.
Sierra Talc Co., 401 Equitable Bank Building, Los Angeles.	18 miles from Keeler, Inyo County.
Western Talc & Magnesite Co., Los Angeles	Tecopa, Inyo County.
GEORGIA	
Georgia Talc Co., Asheville, N. C	Foot of Cohutta Mountain, 3¼ miles southeast of Chatsworth, Murray County.
MARYLAND	
Harford Talc Co. (Inc.), 1801 Chelsea Road, Baltimore	Near Dublin, Harford County.
Maryland Mineral Co. (Inc.), Conowingo	Conowingo, Cecil County.
Herbert I. Oursler, Marriottsville	¼ mile west of Henryton, Carroll County.
NEW JERSEY	
Rock Products Co., 403 Trust Building, Easton, Pa	Above Marble Hill, on Delaware River, near Phillipsburg, Warren County.
NEW YORK	
Carbola Chemical Co (Inc.), Natural Bridge	1¼ miles from Natural Bridge, Lewis County.
International Pulp Co., 41 Park Row, New York City.	Talcville, St. Lawrence County.
W. H. Loomis Talc Corporation, 173 East Main Street, Gouverneur.	Fowler, St. Lawrence County.
NORTH CAROLINA	
Georgia Talc Co., Asheville	Near Marshall, Madison County.
North Carolina Talc & Mining Co. Hewitts	Hewitts, Swain County.
Standard Mineral Co. (Inc.), Hemp	2½ miles from Hemp, Moore County.
Virginia-Carolina Soapstone Co., Box 405, Roanoke, Va.	5½ miles south of Jefferson, Ashe County.
PENNSYLVANIA	
C. K. Williams & Co., 640 North Thirteenth Street, Easton.	Near Easton, Northampton County.
VERMONT	
American Soapstone Finish Co., Chester	2½ miles from Chester, Windsor County.
Eastern Magnesia Talc Co. (Inc.), Burlington	East Granville, Addison County; Rochester, Windsor County; and Waterbury, Washington County.
Vermont Talc Co., Chester	Windham, Windham County.
VIRGINIA	
Albemarle Soapstone Corporation, Charlottesville	3 miles from Esmont, Albemarle County.
Armstrong Products Corporation, Arrington	Near Arrington, Nelson County.
Blue Ridge Talc Co. (Inc.), Henry	¾ mile east of Henry station, Franklin County
Bull Run Talc & Soapstone Co. (Inc), Clifton Station	3 miles north of Clifton, Fairfax County.
Standard Soapstone Corporation, 341 Madison Avenue, New York, N. Y.	Near Arrington, Nelson County.
Virginia Alberene Corporation, 153 West Twenty-third Street, New York, N. Y.	Schuyler, Nelson County.

In 1926 talc in the crude state was worth $2 to $7 a ton; the price of manufactured talc (talc crayons) ranged from about $60 to $225 a ton and of ground talc from $8 to $20 a ton.

Soapstone in rough quarry blocks or in crude state is worth $5 to $10 a ton. Reports of producers showed, however, that no soapstone was sold in that form in 1926. When sawed into slabs and manufactured into laundry tubs, laboratory table tops, and other products, its value increases greatly, and material of this class ranged in value from about $50 to $200 a short ton in 1926.

REVIEW BY STATES

California.—In 1926 sales of talc by producers increased 4 per cent in quantity and 20 per cent in value as compared with 1925. The sales were made by the same producers (six in number) as in 1925. Most of the talc mined in California is used for making talcum powder; the requirements for this purpose are freedom from grit or harmful impurities such as iron and lime, pure white or flesh color, and good slip. Some California talc, however, is used as a filler in paper, paint, soap, and rubber manufacture. The average value of crude talc shipped in 1926 was $6.59 a ton f. o. b. mines, and in 1925, $6.50; the average value of ground talc was $17.08 a ton f. o. b. mills in 1926 and $14.46 in 1925. These were the only grades sold by producers in California in 1925 and 1926.

Georgia.—The Georgia Talc Co. was the only producer of talc in the State in 1926. Most of the product was sold in the ground form, but some was used in the manufacture of crayons, of which there was a large increase in both quantity and value.

Maryland.—The total sales of talc by producers increased 5 per cent in quantity and 18 per cent in value as compared with 1925. Three producers, the same as in 1925, reported sales; they were the Harford Talc. Co. (Inc.), which mines a refractory talc; the Maryland Mineral Co. (Inc.), which shipped crude talc; and Herbert I. Oursler, who shipped talc schist.

New Jersey and Pennsylvania.—The sales of talc by producers in New Jersey and Pennsylvania were made in the ground form, and the sales in New Jersey were largely in excess of the quantity sold in 1925.

New York.—New York outranked all other States in the quantity and value of talc sold in 1926. The product was sold by the same producers as in 1925, namely, the Carbola Chemical Co. (Inc.), the International Pulp Co., and the W. H. Loomis Talc Corporation. All the talc was sold in the ground form at an average of about $12 a ton. The W. H. Loomis Talc Corporation continued experiments with its product, a short fiber talc known as "loomite," in the manufacture of waterproof concrete. The company claims that experiments have demonstrated that the addition of loomite to concrete gives concrete greater workability, prevents segregation, lessens the mixing water required for working a batch, prevents loss of strength due to excess mixing water, and through its absorptive properties retains water in the concrete, thereby prolonging the curing period. The concrete is said to be denser and less pervious than ordinary concretes, and as loomite is inert to ordinary acids and alkalies it will render concrete more resistant to their action.

North Carolina.—The Georgia Talc Co. worked the Edwards and Big Laurel talc mines near Marshall, Madison County; the product was used in the manufacture of crayons. The Standard Mineral Co. (Inc.) mined pyrophyllite at its property near Hemp, Moore County. The North Carolina Talc & Mining Co. resumed operations at its property at Hewitts, Swain County; the product was manufactured and shipped as talc crayons. The Talc Products Co.'s property at Glendon, which has not been worked for several years, has been incorporated in the State of North Carolina under the name of the United Talc & Crayon Co. (Inc.); the company made no shipments. The Virginia-Carolina Soapstone Co., successor to the

National Soapstone Co. (Inc.), made its initial shipment of manufactured soapstone.

Vermont.—Vermont was the second largest producer of talc in the United States in 1926. Sales by producers decreased in both quantity and value compared with 1925. The talc was sold crude, manufactured (in the form of crayons), and ground. The bulk of the output, however, was used in the ground form by the paper, rubber, and roofing trades.

Virginia.—Talc was mined and shipped in Virginia by the Blue Ridge Talc Co. (Inc.) and the Bull Run Talc & Soapstone Co. (Inc.). The Virginia Alberene Corporation continued the operation of the Schuyler soapstone quarries in Nelson County. Soapstone was also produced, manufactured, and sold by the Albemarle Soapstone Corporation, the Armstrong Products Corporation, and the Standard Soapstone Corporation. The crude soapstone at all the properties was manufactured and sold in the form of sinks, tubs, slabs, furnace blocks, floor tiles, electric disks, laboratory equipment, and in other forms. The Armstrong Products Corporation ceased work in August, 1926, but expected to reorganize in the near future.

USES

Powdered talc and soapstone are used extensively in the paper, paint, roofing, rubber, foundry, and textile industries and for toilet preparations. A rather unique use of powdered talc is by the farmer, who is said to dust the grains of corn before planting in order to prevent the crows from eating them. Massive talc of the variety known as "lava" grade, free from iron and grit, with no cracks or cleavage planes, is cut into gas tips, blanks for electric insulation, and spark plugs. Only small amounts of this variety are produced in the United States. Talc is also made into crayons and pencils, is used in glass making, and as a polishing agent. Massive soapstone is manufactured into laundry tubs, trays, sinks, laboratory table tops, store fronts, bus-bar compartments, electric insulating material, acid tanks, stair treads, furnace blocks, fuse guards, tiles, treads, aquariums, switchboards, panel boards, bases, insulators, wainscoting, fireless-cooker stones, hearth linings, furnace linings, and griddles.

IMPORTS AND EXPORTS

Talc imported for consumption in the United States, 1917–1926

Year	Crude and unground steatite and French chalk		Manufactures (except toilet preparations) wholly or partly finished [1]		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	2,452	$10,710	16,157	$258,787	18,609	$269,497
1918	1,434	9,253	12,735	251,323	14,169	260,576
1919	1,641	10.105	12,961	248,899	14,602	259.004
1920	941	7,206	21,739	443,514	22,680	450,720
1921	153	2,279	11,468	239,469	11,621	241,748
1922	248	9,850	18,196	367,528	18,444	377,378
1923	560	20,653	19,405	402,238	19,965	422,891
1924	313	4,847	17,496	337,508	17,809	342,355
1925	121	6,547	20,872	443,985	20,993	450,532
1926	199	16,366	23,642	523,716	23,841	540,082

[1] Prior to Sept. 22, 1922, the classification was "Talc, steatite, and French chalk—cut, ground, or washed."

Talc, ground or unground, imported into the United States, 1925–26, by countries

[General imports]

Country	1925		1926	
	Short tons	Value	Short tons	Value
Austria	90	$2,866	74	$2,391
Belgium	165	1,093	102	5,536
Canada	9,577	114,272	9,735	112,988
China	65	43,025	126	78,310
Czechoslovakia			(1)	20
France	4,668	84,469	6,326	105,594
Germany	19	1,393	73	3,097
Hong Kong	(1)	45		
India (British)	56	2,524	30	1,426
Iraq			(1)	14
Italy	6,249	192,342	7,776	241,234
Japan	2	2,419	5	5,486
Netherlands	7	1,888		
Spain	27	1,091	(1)	9
Straits Settlements	(1)	43		
United Kingdom	65	1,868	99	7,694
	20,990	449,338	24,346	563,799

[1] Less than 1 ton.

Exports of talc in bulk are not recorded. The exports of "talcum and other toilet powders" in 1922 amounted to 1,821 short tons, valued at $1,397,542; in 1923, 1,907 tons, valued at $1,671,588; in 1924, 1,614 tons, valued at $1,688,211; in 1925, 1,734 tons, valued at $1,882,196; and in 1926, 1,645 tons, valued at $1,726,933. Similar exports were not separately classified prior to 1922.

WORLD'S PRODUCTION

World's production of talc and soapstone, 1922–1926, by countries, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country [1]	1922	1923	1924	1925	1926
Australia:					
New South Wales	203	207	543	711	366
South Australia	272	425	330	358	560
Austria (exports)	13,480	7,489	9,587	12,883	13,846
Canada	11,970	9,404	10,280	13,131	14,304
France	48,170	48,780	69,350	69,352	(2)
Germany (Bavaria)	4,513	1,907	3,997	3,461	3,834
Great Britain	51	189			
Greece		132	139	(2)	(2)
India (British)	4,830	7,137	2,898	2,854	(2)
Italy	26,524	31,189	32,208	33,662	43,075
Japan [3]	49,003	35,918	41,867	44,094	(2)
Norway	7,821	8,907	11,785	9,032	7,608
Spain	3,078	1,983	1,977	1,771	1,658
Sweden	[4] 2,063	[4] 2,430	[4] 2,873	[4] 2,374	(2) [5]
Union of South Africa (Transvaal)	309	322	575	60	76
United States	180,242	178,435	184,902	[5] 165,339	[5] 164,715
Uruguay (exports)	609	996	(2)	913	(2)

[1] In addition to the countries listed, Brazil produces a small quantity of talc, and China produces both talc and soapstone. No data of production are available for Brazil; in 1924 exports of talc were reported as 120 kilograms. China's output of talc in 1925 is officially estimated at 31,516 tons; similar data are not available for other years. No figures are available on the production of unmanufactured soapstone; the output of soapstone ware in 1925 is reported as 112 tons. (Hsieh, C. Y., Special Rept. No. 2, China Geol. Survey, Peking, 1926.)

[2] Data not available.

[3] Includes agalmatolite.

[4] Exclusive of a small quantity for which value only is given.

[5] Figures represent talc only. Bureau of Mines not at liberty to publish figures for soapstone.

STONE

By A. T. Coons

SUMMARY OF PRODUCTION

The total stone sold or used by producers in the United States in 1926 amounted to 7 per cent more in quantity and 8 per cent more in value than in 1925. Granite, basalt, sandstone, and limestone made gains in both quantity and value. Marble showed an increase in value but a slight decrease in quantity, and "other" stone decreased in both quantity and value.

The tables in this report give the quantities sold or used by producers and the values f. o. b. at quarries and mills, so far as these are obtainable. Stone quarried and used by the producer is considered as sold and is included in the figures given for sales. The figures do not, however, include the stone made into abrasives (such as grindstones, etc.), glass sand, lime, or cement and reported in terms of finished product. These products are treated in the chapters on abrasives, sand and gravel, lime, and cement; but an estimate of the total amount of limestone used for all purposes is given on page 232.

Stone sold or used by producers in the United States, 1917–1926, by kinds

[Quantities approximate]

Year	Granite		Basalt and related rocks (trap rock)		Marble		Limestone	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	5,564,200	$15,544,957	9,103,580	$7,570,885	310,130	$6,330,387	63,481,500	$46,263,379
1918	3,827,400	14,466,423	6,859,200	7,782,280	305,720	5,496,389	53,868,200	49,453,006
1919	4,221,220	19,345,714	7,410,770	8,944,686	333,400	8,042,297	49,759,800	53,171,701
1920	4,760,000	24,954,908	9,219,200	12,260,148	431,500	11,069,585	59,290,000	75,655,260
1921	4,752,180	20,592,217	8,524,480	11,450,899	315,400	8,580,416	45,621,000	57,749,594
1922	5,913,120	21,125,869	10,032,900	12,600,611	427,870	10,534,671	58,928,660	68,397,927
1923	7,300,130	29,704,796	10,674,470	13,539,648	562,560	12,863,974	76,701,360	89,620,007
1924	6,883,860	28,772,161	11,671,500	14,679,523	516,000	13,302,235	75,894,430	89,868,956
1925	8,074,200	30,531,347	11,842,110	14,770,042	564,150	13,882,457	85,649,440	98,008,028
1926	9,330,390	32,044,523	12,977,740	15,950,302	563,170	14,167,480	91,887,900	109,252,299

Year	Sandstone		Other stone [1]		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	3,880,500	$5,512,421	1,234,990	$993,642	83,574,900	$82,215,671
1918	2,858,100	4,529,298	844,740	973,034	68,563,360	82,700,430
1919	2,623,270	5,283,842	1,190,540	1,920,903	65,539,000	96,709,143
1920	3,343,000	7,310,290	1,483,300	2,291,769	78,527,000	133,541,960
1921	2,640,460	6,425,339	1,685,220	2,163,801	63,538,740	106,962,266
1922	3,388,130	7,521,044	1,520,880	1,886,806	80,211,560	122,066,928
1923	4,349,270	9,174,706	3,730,870	4,567,110	103,318,660	159,470,241
1924	3,894,690	10,142,099	4,323,640	5,105,139	103,184,120	161,870,113
1925	4,479,330	10,920,016	5,242,140	6,104,902	115,851,370	174,216,792
1926	4,978,530	11,149,029	4,758,630	5,744,957	124,496,360	188,308,590

[1] Includes mica schist, conglomerate, argillite, various light-colored volcanic rocks, serpentine not used as marble, and such other stone as can not be properly classed in any of the main groups.

As usual, demand during the year varied with the use of the stone. Building stone, flagstone, riprap, crushed stone, fluxing stone, refractory stone, and stone sold for miscellaneous uses showed increased demand. Stone for monumental and memorial work, for paving blocks, and for manufacturing industries was in somewhat less demand than in 1925, but demand for curbing and for rubble increased decidedly. Operating costs in 1926 were about the same as in 1925, and prices remained about the same, but with a rising tendency in stone for high-grade construction stone and for monumental stone. Labor conditions were little changed, and the effort to standardize products and to improve quarry methods was continued.

Stone sold or used by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone—cubic feet	30,695,310	$35,444,809	33,467,420	$39,922,851
Approximate equivalent in short tons	2,392,420		2,609,190	
Monumental stone—cubic feet	4,371,380	14,404,339	4,335,770	14,580,929
Approximate equivalent in short tons	363,060		359,950	
Paving blocks—number	40,143,220	3,680,687	39,563,180	3,399,602
Approximate equivalent in short tons	380,710		366,370	
Curbing—cubic feet	5,075,620	4,313,446	4,409,930	4,303,280
Approximate equivalent in short tons	393,460		346,020	
Flagging—cubic feet	762,280	562,344	902,424	657,435
Approximate equivalent in short tons	55,790		66,330	
Rubble—short tons	1,197,170	2,060,868	539,670	917,433
Riprap—do	3,079,270	2,794,379	4,060,280	4,652,717
Crushed stone—do	75,672,930	80,508,429	82,515,560	87,872,014
Furnace flux (limestone and marble)—do	22,860,890	17,344,190	23,859,390	18,049,012
Refractory stone (ganister, mica schist, and dolomite)—short tons	1,261,130	1,548,190	1,531,070	1,925,832
Manufacturing industries (limestone and marble)—short tons	5,171,520	4,941,669	4,953,800	4,376,026
Other uses [1]—do	3,023,020	6,613,442	3,288,730	7,651,459
Total (quantities approximate in short tons)	115,851,370	174,216,792	124,496,360	188,308,590

[1] Chiefly agricultural limestone. (See pp. 226, 230, and 232.)

Building stone.—Aggregate sales of building stone of all kinds increased 9 per cent in quantity and 13 per cent in value over 1925. Limestone gained 16 per cent in quantity and granite 9 per cent. Marble showed a very slight increase in quantity over 1925, with a decrease of 2 per cent in value. Sandstone decreased 4 per cent in quantity and increased 12 per cent in value. Basalt and miscellaneous varieties of stone used for building declined considerably both in quantity and value. The quantity and value of both the rough stone and dressed stone sold increased, and the average value per cubic foot of all building stone sold in 1926 was somewhat greater than in 1925. Tables showing the sales of building limestone at the principal quarry centers are given on pages 233 to 236 of this report. The figures for building stone by kinds as reported for 1925 and 1926 are as follows:

Building stone sold or used by producers in the United States, 1925 and 1926, by kinds

Kind	Rough				Finished				Total	
	Constructional		Architectural		Sawed [1]		Cut [1]			
	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value
1925										
Granite	5,351,870	$737,836	1,179,720	$1,008,019	[1] 390,330	[1] $950,481	[1] 593,480	[1] $4,118,241	7,515,400	$6,814,577
Basalt	532,000	59,985							532,000	59,985
Marble			1,057,380	2,363,966	907,100	1,942,014	900,820	5,294,131	2,865,300	9,600,111
Limestone	3,186,900	335,842	5,728,830	3,661,276	4,897,650	5,278,552	2,170,420	6,816,409	15,983,800	16,092,079
Sandstone	1,052,600	114,055	908,360	506,591	1,093,810	1,231,090	419,390	961,358	3,474,160	2,813,094
Miscellaneous	324,650	64,963							324,650	64,963
	10,448,020	1,312,681	8,874,290	7,539,852	7,288,890	9,402,137	4,084,110	17,190,139	30,695,310	35,444,809
1926										
Granite	6,105,350	852,265	1,150,130	943,746	[1] 228,430	[1] 944,021	[1] 698,000	[1] 4,143,481	8,181,910	6,883,513
Basalt	336,140	31,107							336,140	31,107
Marble			1,043,220	2,242,339	949,220	2,180,736	875,500	4,996,864	2,867,940	9,419,939
Limestone	3,361,470	380,131	6,161,390	3,837,081	5,650,210	6,003,282	3,364,880	10,171,103	18,537,950	20,391,597
Sandstone	809,780	97,192	889,980	555,136	1,378,140	1,524,757	268,650	977,122	3,346,550	3,154,207
Miscellaneous	196,930	42,488							196,930	42,488
	10,809,670	1,403,183	9,244,720	7,578,302	8,206,000	10,652,796	5,207,030	20,288,570	33,467,420	39,922,851

[1] For granite, sawed stone corresponds to dressed stone for construction work (walls, foundations, bridges) and cut stone to architectural stone for high-class buildings

Monumental stone.—Stone for monumental and memorial work decreased less than 1 per cent in quantity and increased 1 per cent in value in 1926 compared with 1925. Granite gained 1 per cent in quantity but declined 3 per cent in value. Marble decreased 7 per cent in quantity and increased 12 per cent in value.

Paving blocks, curbstone, flagstone, and crushed stone.—Street and road material in general showed larger sales in 1926, although curbing declined 13 per cent in quantity and paving blocks 1 per cent. Stone for flagstones increased 18 per cent in quantity. The total quantity of crushed stone sold increased 9 per cent over 1925. Crushed stone for concrete and road work in 1926 gained 6 per cent in quantity and crushed stone reported as railroad ballast gained 22 per cent over 1925.

Fluxing stone.—Stone used by blast furnaces, open-hearth steel works, smelters, and other metallurgic plants for fluxing increased 4 per cent in quantity.

Refractory stone.—Stone (dolomite, quartzite, and mica schist) reported for refractory use increased 21 per cent in quantity. The raw dolomite reported for the manufacture of refractories in 1926 increased 23 per cent in quantity. Exact figures for raw dolomite for this purpose are hard to obtain, because sales to furnaces and smelters tend to cause it to be reported as fluxing stone. Operators, who both quarry and dead-burn or sinter dolomite, reported 386,715 short tons of the sintered material for 1926—a decrease of 1 per cent. Quartzite (ganister) used in the manufacture of refractory brick, for furnace or converter lining, and for the manufacture of ferrosilicon increased 22 per cent in quantity in 1926, and mica schist used as furnace and kiln lining decreased 7 per cent.

Manufacturing industries and "other uses."—The total quantity of stone for manufacturing industries and "other uses" increased less than 1 per cent in 1926.

Stone sold or used by producers in the United States, 1925 and 1926, by States

State	1925			1926		
	Number of active plants	Short tons (approximate)	Value	Number of active plants	Short tons (approximate)	Value
Alabama	21	1,392,790	$2,142,595	19	1,296,440	$2,048,193
Alaska	1	(1)	(1)	1	(1)	(1)
Arizona	13	435,060	306,763	9	685,970	397,632
Arkansas	13	374,940	448,313	16	388,200	435,108
California	165	9,096,170	10,341,815	162	9,248,240	10,546,571
Colorado	47	[2] 674,610	[2] 881,756	44	911,450	1,107,867
Connecticut	41	1,830,210	2,655,339	34	[2] 2,069,920	[2] 2,680,849
Delaware	3	118,940	219,054	3	99,150	157,637
District of Columbia	2	(1)	(1)	4	5,890	20,526
Florida	33	4,026,790	4,687,107	53	6,785,430	7,411,506
Georgia	32	734,140	4,971,493	45	820,570	5,470,561
Hawaii	9	348,150	675,677	11	399,900	849,302
Idaho	31	[2] 317,470	[2] 424,008	17	[2] 179,320	[2] 295,209
Illinois	72	8,576,830	7,722,683	72	[2] 9,145,180	[2] 8,479,277
Indiana	105	[2] 4,455,310	[2] 18,140,974	98	4,699,230	22,797,189
Iowa	26	805,140	870,230	27	938,520	897,262
Kansas	48	[2] 705,780	[2] 958,779	47	[2] 850,560	[2] 1,057,276
Kentucky	81	1,703,010	2,127,504	72	1,907,960	2,168,183
Louisiana	1	(1)	(1)	2	122,870	207,883
Maine	54	[2] 361,570	[2] 2,870,442	49	311,830	2,360,593
Maryland	43	[2] 1,136,880	[2] 1,853,881	40	[2] 1,432,290	[2] 2,177,102
Massachusetts	95	[2] 2,209,560	6,640,333	86	[2] 2,089,340	[2] 6,216,793
Michigan	30	11,598,680	6,671,804	28	[2] 10,885,730	[2] 6,715,429
Minnesota	51	753,740	3,784,252	52	682,800	3,746,392
Mississippi	2	(1)	(1)	2	(1)	(1)
Missouri	131	[2] 2,796,510	[2] 5,662,835	123	3,093,000	6,012,613
Montana	24	[2] 237,860	[2] 222,566	25	[2] 294,120	[2] 257,919
Nebraska	7	135,910	225,669	6	105,740	185,057
Nevada	5	102,710	127,359	6	[2] 59,630	[2] 89,072
New Hampshire	26	[2] 130,120	[2] 1,712,138	25	148,250	1,908,284
New Jersey	46	2,335,820	3,656,943	45	2,315,450	3,589,119
New Mexico	4	121,950	92,034	1	(1)	(1)
New York	141	[2] 8,869,200	[2] 12,358,238	136	9,708,760	13,713,620
North Carolina	30	[2] 1,565,690	[2] 3,478,855	34	[2] 1,843,480	[2] 4,005,087
Ohio	139	[2] 12,010,510	[2] 13,084,572	121	13,103,140	13,763,207
Oklahoma	28	1,418,960	1,613,436	29	[2] 1,555,580	[2] 1,485,436
Oregon	114	1,690,930	1,858,644	92	2,139,910	2,152,512
Pennsylvania	440	[2] 16,124,590	[2] 18,870,945	423	[2] 16,628,770	[2] 19,157,336
Porto Rico	9	73,460	113,515	13	71,630	111,291
Rhode Island	21	[2] 153,230	[2] 724,428	19	[2] 252,280	[2] 895,718
South Carolina	13	833,100	1,315,613	13	881,180	1,505,869
South Dakota	27	211,880	456,342	25	211,340	472,032
Tennessee	41	[2] 1,835,150	[2] 4,334,891	42	[2] 1,693,080	[2] 4,170,016
Texas	36	[2] 2,503,300	[2] 2,076,560	35	3,117,020	2,595,018
Utah	21	878,270	459,722	21	732,960	623,608
Vermont	47	[2] 283,030	[2] 8,958,846	42	330,230	9,244,465
Virginia	98	[2] 2,670,660	[2] 3,224,259	99	[2] 3,047,220	[2] 3,504,671
Washington	51	576,690	1,042,165	46	[2] 461,570	[2] 979,482
West Virginia	62	3,348,200	3,349,143	40	3,211,650	3,402,327
Wisconsin	134	[2] 2,541,360	[2] 4,208,201	142	[2] 2,852,070	[2] 4,937,661
Wyoming	10	[2] 133,410	[2] 245,058	12	153,940	316,463
Undistributed		613,100	1,349,013		528,230	986,967
	2,724	115,851,370	174,216,792	2,608	124,496,360	188,308,590

[1] Included under "Undistributed."

[2] To avoid disclosing confidential information, certain State totals are slightly incomplete, the figures not included being combined under "Undistributed."

EXPORTS AND IMPORTS[1]

Value of stone exported from the United States, 1917–1926

Year	Marble in blocks, rough or dressed, and other building or monumental stone [a]	Other manufactures of stone [a]	Total	Year	Marble in blocks, rough or dressed, and other building or monumental stone [a]	Other manufactures of stone [a]	Total
1917	$572,097	$1,108,185	$1,680,282	1922	$681,658	$903,102	$1,584,760
1918	552,261	1,208,164	1,760,425	1923	625,442	783,195	1,408,637
1919	770,392	1,508,997	2,279,389	1924	499,602	448,731	948,333
1920	774,442	2,158,764	2,933,206	1925	507,391	725,677	1,233,068
1921	576,905	1,697,570	2,274,475	1926	687,115	896,130	1,583,245

[a] Exports classification beginning 1922.

[1] Figures on exports and imports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Stone exported from the United States in 1926, by countries

Country	Marble in blocks, rough or dressed		Other building or monumental stone		Other manufactures of stone (including paving blocks and curbing)	Total value
	Cubic feet	Value	Cubic feet	Value		
North America:						
Canada	49,742	$192,391	312,240	$294,062	$616,130	$1,102,583
Central America—						
British Honduras					1,336	1,336
Costa Rica					1,140	1,140
Guatemala					4,441	4,441
Honduras					2,750	2,750
Nicaragua					256	256
Panama	58	428			3,133	3,561
Salvador	6	25			553	578
Mexico	304	1,464	1,501	3,143	34,800	39,407
Newfoundland and Labrador	1,942	11,002			2,802	13,804
West Indies—						
British—						
Barbados	57	289	24	104	812	1,205
Bermuda	293	679			842	1,521
Jamaica					3,513	3,513
Trinidad and Tobago			222	449	405	854
Other	90	722	13	40	3,003	3,765
Cuba	2,247	6,952	9,928	132,536	19,844	159,332
Dominican Republic	20	43			5,756	5,799
Dutch					275	275
Haitian Republic	4	75			837	912
Virgin Islands of the United States	35	40			1,471	1,511
South America:						
Argentina					3,301	3,301
Brazil					2,529	2,529
Chile					1,216	1,216
Colombia					9,404	9,404
Ecuador					907	907
Peru					1,802	1,802
Venezuela					3,908	3,908
Other	11	41			1,918	1,959
Europe:						
France					4,341	4,341
Germany					27,756	27,756
Italy					30	30
Netherlands					12,257	12,257
United Kingdom			400	1,755	24,555	26,310
Other	12	30	100	216	3,346	3,592
Asia:						
China	3,630	11,130			3,058	14,188
India (British)					18,726	18,726
Japan	825	1,841	12	55	16,037	17,933
Philippine Islands	185	1,433	1,387	833	8,175	10,441
Other					12,154	12,154
Africa:						
British South Africa					9,702	9,702
Other	10	10			296	306
Oceania:						
Australia	6,820	23,281	2,240	2,005	17,437	42,723
New Zealand	2	41			8,610	8,651
Other					566	566
	66,293	251,917	328,067	435,198	896,130	1,583,245

Value of stone imported for consumption in the United States, 1917–1926

1917	$681,475	1922	$1,895,912
1918	268,577	1923	2,641,337
1919	787,961	1924	2,437,654
1920	1,795,575	1925	2,909,887
1921	1,253,959	1926	3,523,578

Stone imported for consumption in the United States, 1925 and 1926, by kinds

Kind	1925		1926	
	Quantity	Value	Quantity	Value
Marble, breccia, and onyx:				
In blocks, rough, etc.—cubic feet	642,113	$1,326,863	863,219	$1,783,767
Sawed—do	113	576	1,676	5,803
Slabs or paving tiles—superficial feet	671,561	210,072	403,458	222,230
All other manufactures		257,382		438,712
Mosaic cubes of marble or onyx:				
Loose		14,919		6,618
Attached to paper		346		410
		1,810,158		2,457,540
Granite:				
Dressed		359,364		324,794
Rough—cubic feet	213,594	273,298	235,176	287,116
		632,662		611,910
Stone (other):				
Dressed		12,996		17,183
Rough (monumental or building stone)—cubic feet	212,953	167,306	256,950	181,040
Rough (other)		286,765		255,905
		467,067		454,128
Grand total		2,909,887		3,523,578

Marble, breccia, and onyx (rough and manufactured) imported into the United States, 1925 and 1926, by countries

[General imports]

Country	1925				1926			
	Rough marble, breccia, and onyx		Manufactured	Total value	Rough marble, breccia, and onyx		Manufactured	Total value
	Cubic feet	Value			Cubic feet	Value		
Canada			$6,378	$6,378	221	$675	$9,339	$10,014
Cuba	1,818	$3,911	920	4,831			442	442
Guatemala	6,896	21,098		21,098			22	22
Mexico	2,767	16,163		16,163	16,270	72,389	383	72,772
Total North America	11,481	41,172	7,298	48,470	16,491	73,064	10,186	83,250
Belgium	65,586	109,131	51,031	160,162	72,834	99,517	50,362	149,879
France	37,317	56,935	43,488	100,423	71,662	109,699	79,857	189,556
Germany	4,676	12,100	28,036	40,136	14,104	35,513	96,318	131,831
Greece	6,133	28,657		28,657	17,379	68,841	49	68,890
Italy	510,219	1,058,822	307,404	1,366,226	662,251	1,378,369	391,490	1,769,859
Netherlands	1,015	1,983		1,983			43	43
Spain	739	1,216	15,929	17,145	5,094	11,769	1,609	13,378
United Kingdom	173	1,528	9,513	11,041	776	2,133	7,704	9,837
Other Europe[1]	1,253	3,141	10,727	13,868	1,950	3,789	9,525	13,314
Total Europe	627,111	1,273,513	466,128	1,739,641	846,050	1,709,630	636,957	2,346,587
China			6,265	6,265			22,616	22,616
Japan			525	525			9,049	9,049
Other countries[2]	1,798	5,032	2,453	7,485	2,838	8,935	5,699	14,634
	1,798	5,032	9,243	14,275	2,838	8,935	37,364	46,299
Grand total	640,390	1,319,717	482,669	1,802,386	865,379	1,791,629	684,507	2,476,136

[1] 1925: Austria, Czechoslovakia, Estonia, Norway, Portugal, Switzerland, and Turkey; 1926: Austria, Czechoslovakia, Denmark and Faroe Islands, Finland, Gibraltar, Hungary, Poland and Danzig, Sweden, and Switzerland.

[2] 1925: Algeria and Tunisia, Egypt, Hong Kong, India (British), Palestine and Syria, Uruguay, and Virgin Islands of the United States; 1926: Aden, Algeria and Tunisia, Australia, Bolivia, Ceylon, Egypt, Hong Kong, India (British), Morocco, Newfoundland and Labrador, Palestine, Syria, Turkey in Asia, and Uruguay.

Value of building or monumental stone (exclusive of marble, breccia, and onyx) and other classes of stone imported into the United States, 1925 and 1926, by countries

[General imports]

Country	1925			1926		
	Building or monumental stone	Other stone	Total	Building or monumental stone	Other stone	Total
North America:						
Canada	$55,601	$258,157	$313,758	$71,931	$243,206	$315,137
Mexico				60		60
Total North America	55,601	258,157	313,758	71,991	243,206	315,197
Europe:						
Austria	8		8			
Belgium	499	111	610	940		940
Czechoslovakia	33,700		33,700	54,030		54,030
Denmark	3,197		3,197		452	452
Finland	50,059		50,059	104,909		104,909
France	23,056	20	23,076	63,266		63,266
Germany	177,352	8,672	186,024	191,810	6,838	198,648
Italy	217,261	426	217,687	202,783	9	202,792
Netherlands	12	10,601	10,613	3	21,148	21,151
Norway	15,756		15,756	10,093	1,055	11,148
Portugal	12,652		12,652	6,100		6,100
Spain	3,638	19	3,657	4,557		4,557
Sweden	175,299	3	175,302	203,847	1,145	204,992
United Kingdom	106,904	29,926	136,830	55,458	5,898	61,356
Total Europe	819,393	49,778	869,171	897,796	36,545	934,341
Other countries[1]	2,642	567	3,209	11,310	97	11,407
Grand total	877,636	308,502	1,186,138	981,097	279,848	1,260,945

[1] 1925: British West Indies, China, Egypt, Hong Kong, India (British), Japan, and Palestine and Syria; 1926: China, Hong Kong, India (British), Japan, New Zealand, and Palestine.

PRODUCTION BY KINDS AND STATES

GRANITE

Granite sold or used by producers in 1926 increased 16 per cent in quantity and 5 per cent in value over 1925. Building stone gained 9 per cent in quantity, monumental stone 1 per cent, crushed stone 11 per cent, and curbing 26 per cent. The output of riprap was more than double that of 1925, largely because of stone quarried and used in California.

Granite for miscellaneous uses also increased, but there was a considerable decrease in the quantity of rubblestone reported and a small decrease in the number of paving blocks sold.

Granite sold or used by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone (rough and dressed)—cubic feet	7,515,400	$6,814,577	8,181,910	$6,883,513
Approximate equivalent in short tons	624,150		677,370	
Monumental stone—cubic feet	3,195,290	10,805,432	3,240,550	10,533,072
Approximate equivalent in short tons	263,170		266,940	
Paving—number of blocks	37,674,930	3,485,714	37,148,000	3,223,327
Approximate equivalent in short tons	357,960		340,320	
Curbing—linear feet	2,779,570	1,839,830	3,503,370	2,402,284
Approximate equivalent in short tons	144,330		182,430	
Rubble—short tons	270,410	328,379	121,910	182,306
Riprap—do	567,060	625,203	1,195,090	1,194,092
Crushed stone—do	5,825,550	6,510,900	6,469,100	7,459,139
Other uses—do	21,570	121,312	77,230	166,790
Total (quantities approximate, in short tons)	8,074,200	30,531,347	9,330,390	32,044,523

Granite sold or used by producers in the United States, 1925 and 1926, by States

[Quantities approximate]

State	1925		1926	
	Short tons	Value	Short tons	Value
Arizona	350,320	$168,494	576,910	$205,014
Arkansas	(1)	(1)	(1)	(1)
California	2,242,130	3,368,233	2,840,850	3,603,270
Colorado	63,470	213,256	62,210	194,386
Connecticut	56,500	764,657	92,890	547,632
Delaware	118,940	219,054	99,150	157,637
District of Columbia	(1)	(1)	5,890	20,526
Georgia	461,440	1,798,353	536,170	2,243,491
Idaho	57,000	57,000		
Maine	322,040	2,774,707	221,210	2,204,030
Maryland	275,030	519,071	283,010	512,749
Massachusetts	597,310	4,156,762	706,170	4,062,460
Minnesota	61,200	2,121,850	31,920	2,200,116
Missouri	14,150	137,348	10,010	97,685
Montana	21,750	47,965	32,130	60,756
New Hampshire	130,120	1,712,138	148,250	1,908,284
New Jersey	(1)	(1)	(1)	(1)
New York	96,850	349,443	103,200	646,200
North Carolina	1,200,640	2,864,490	1,621,830	3,670,067
Oklahoma	44,900	194,005	59,230	164,248
Oregon	29,350	25,437	(1)	(1)
Pennsylvania	308,930	812,810	269,590	692,139
Rhode Island	94,280	583,960	54,620	549,255
South Carolina	833,100	1,315,613	881,180	1,505,869
South Dakota	1,480	157,967	1,830	177,299
Texas	7,860	178,375	7,790	186,765
Utah	(1)	(1)	880	8,325
Vermont	105,260	3,705,624	117,200	3,908,917
Virginia	222,530	335,221	254,710	383,883
Washington	46,050	93,993	24,430	115,248
Wisconsin	245,760	1,746,784	252,900	1,935,168
Undistributed	65,810	108,737	34,230	83,104
	8,074,200	30,531,347	9,330,390	32,044,523

[1] Included under "Undistributed."

Granite sold or used by producers in the United States in 1926, by States and uses

State	Number of active plants	Building						Monumental				Paving blocks	
		Rough				Dressed		Rough		Dressed			
		Construction		Architectural									
		Short tons	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Number	Value
Arizona	3												
Arkansas	1												
California	32			(2)	(2)	[2] 189,240	[2] $844,332	41,210	$94,390	32,560	$225,879		
Colorado	8							(2)	(2)	[2] 16,250	[2] 111,665		
Connecticut	14	(1)	(1)	(2)	(2)	[2] 17,190	[2] 98,562	30,560	103,898	17,530	204,134	(1)	(1)
Delaware	3	(1)	(1)										
District of Columbia	4												
Georgia	35	6,370	$5,924	(2)	(2)	[2] 115,590	[2] 466,637	118,950	157,612	16,720	61,914	2,501,100	$165,963
Maine	42	9,120	7,395	464,030	$265,967	97,440	398,424	144,770	130,116	14,450	70,273	12,599,440	1,162,535
Maryland	11	113,740	207,549	(1)	(1)	(1)	(1)	5,000	6,500				
Massachusetts	51	151,030	155,089	215,740	182,695	296,740	987,753	281,850	458,488	59,100	462,126	7,048,560	702,192
Minnesota	25			(2)	(2)	[2] 87,450	[2] 686,699	74,760	197,593	170,440	1,288,187	325,540	27,104
Missouri	3							(1)	(1)			(1)	(1)
Montana	11			(1)	(1)	(1)	(1)	[3] 4,920	[3] 22,723	(3)	(3)		
New Hampshire	25	2,710	2,544	53,520	60,905	113,290	888,855	106,780	184,182	23,620	132,169	4,214,540	305,672
New Jersey	2	(1)	(1)										
New York	16	(1)	(1)	(2)	(2)	[2] 77,080	[2] 425,259	[3] 12,200	[3] 51,952	(3)	(3)	(1)	(1)
North Carolina	27	(1)	(1)	[3] 182,890	[3] 345,220	(3)	(3)	(1)	(1)	(1)	(1)	3,783,330	258,134
Oklahoma	9			(1)	(1)	(1)	(1)	12,350	29,935	10,560	85,921		
Oregon	1									(1)	(1)		
Pennsylvania	34	163,790	387,405	29,980	16,125	480	3,450	(2)	(2)	[2] 18,240	[2] 131,679	56,370	5,007
Rhode Island	11	4,600	6,764					[3] 241,490	[3] 466,442	(3)	(3)	(1)	(1)
South Carolina	13	8,390	11,730	(2)	(2)	[2] 1,750	[2] 1,250	(1)	(1)			(1)	(1)
South Dakota	5							(2)	(2)	[2] 20,990	[2] 177,189		
Texas	10			11,190	12,988	10,750	38,000	47,400	103,952	3,250	30,000		
Utah	2			3,100	2,100			7,570	6,129			1,600	96
Vermont	29	(1)	(1)	[3] 56,200	[3] 177,650	(3)	(3)	1,273,450	3,676,831	9,380	40,056	(1)	(1)
Virginia	9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Washington	5	880	875			5,970	45,702	6,690	17,824	3,560	35,653		
Wisconsin	24	(1)	(1)	(2)	(2)	[2] 4,510	[2] 32,653	15,110	34,935	116,880	1,140,828	4,927,160	451,205
Undistributed		45,140	66,990	30,240	23,648	12,190	26,374	257,870	428,523	24,090	163,374	1,690,360	145,419
	465	505,770	852,265	1,150,130	943,746	926,430	5,087,502	2,679,420	6,120,044	561,130	4,413,028	37,148,000	3,223,327

State	Curbing		Rubble		Riprap		Crushed stone				Other uses		Total	
							Concrete and road metal		Railroad ballast					
	Linear feet	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons (approximate)	Value
Arizona					[1]	[1]	[1]	[1]	[1]	[1]			576,910	$205,014
Arkansas			[1]	[1]									[1]	[1]
California	3,450	$4,500	[1]	[1]	935,300	$890,403	1,600,040	$1,266,217	282,250	$269,538	[1]	[1]	2,840,850	3,603,270
Colorado							60,840	82,721					62,210	194,386
Connecticut	24,370	27,058	[1]	[1]	21,400	15,022	[1]	[1]					92,890	547,632
Delaware	[1]	[1]			[1]	[1]	[1]	[1]					99,150	157,637
District of Columbia			5,830	$19,432							60	$1,094	5,890	20,526
Georgia	1,700,560	949,833	47,000	46,876	[1]	[1]	282,420	329,281	41,160	18,770	[1]	[1]	536,170	2,243,491
Maine	136,300	134,469			6,830	7,460	22,090	27,391					221,210	2,204,030
Maryland			6,850	11,404	[1]	[1]	86,430	140,785	[1]	[1]	1,710	5,578	283,010	512,749
Massachusetts	441,200	429,362	29,530	30,689	13,610	11,658	337,830	627,060			5,600	15,348	706,170	4,062,460
Minnesota					[1]	[1]					[1]	[1]	31,920	2,200,116
Missouri			[1]	[1]									10,010	97,685
Montana					[1]	[1]	[1]	[1]			[1]	[1]	32,130	60,756
New Hampshire	256,540	234,072	1,050	2,043	1,740	1,907	59,530	72,886	1,640	3,203	2,910	19,866	148,250	1,908,284
New Jersey							[1]	[1]					[1]	[1]
New York	[1]	[1]	[1]	[1]	[1]	[1]	19,110	24,202	[1]	[1]	4,720	35,265	103,200	646,200
North Carolina	909,500	594,525	15,270	47,197	11,430	10,295	1,405,990	2,066,183	72,850	74,811	3,390	27,684	1,621,830	3,670,067
Oklahoma			[1]	[1]	[1]	[1]	50,990	41,250					59,230	164,248
Oregon													[1]	[1]
Pennsylvania	8,700	15,682	1,610	3,200	17,000	17,693	71,900	100,553	9,400	10,420	270	925	269,590	692,139
Rhode Island	[1]	[1]					27,840	67,763	1,000	1,000	[1]	[1]	54,620	549,255
South Carolina	18,400	6,055	440	580	70,770	97,752	612,680	926,239	165,660	142,158	5,000	5,000	881,180	1,505,869
South Dakota											100	110	1,830	177,299
Texas					1,830	1,825							7,790	186,765
Utah													880	8,325
Vermont	[1]	[1]											117,200	3,908,917
Virginia	[1]	[1]	[1]	[1]	[1]	[1]	193,840	273,834	25,000	24,500	8,000	8,800	254,710	383,883
Washington					19,070	10,254			3,150	4,940			24,430	115,248
Wisconsin	[1]	[1]			[1]	[1]	178,070	261,474			18,800	10,555	252,900	1,935,168
Undistributed	4,350	6,728	14,330	20,885	96,110	129,823	190,880	285,296	666,510	316,664	26,670	36,565	34,230	83,104
	3,503,370	2,402,284	121,910	182,306	1,195,090	1,194,092	5,200,480	6,593,135	1,268,620	866,004	[4] 77,230	[4] 166,790	9,330,390	32,044,523

[1] Included under "Undistributed."
[2] Rough stone included under dressed stone.
[3] Dressed stone included under rough stone.
[4] Includes 3,640 tons of Durax blocks, valued at $30,310, made in Georgia, North Carolina, and Wisconsin.

Monumental granite sold by the quarrymen at Quincy, Mass., 1917–1926

Year	Number of active plants	Short tons (approximate)	Value	Year	Number of active plants	Short tons (approximate)	Value
1917	10	29,000	$398,196	1922	6	16,000	$341,601
1918	5	26,000	336,843	1923	6	27,150	596,709
1919	8	32,000	614,005	1924	6	26,630	527,915
1920	8	27,000	674,233	1925	7	26,500	509,329
1921	6	14,000	311,178	1926	7	23,000	438,963

Monumental granite sold by the quarrymen in the Barre district, Vermont, 1918–1926

Year	Cubic feet	Value	Year	Cubic feet	Value
1918	1,369,000	$2,308,757	1923	1,208,010	$3,300,805
1919	1,376,000	3,623,055	1924	1,025,930	3,366,497
1920	1,147,800	3,957,881	1925	981,560	3,192,282
1921	686,947	2,417,024	1926	1,062,160	3,311,066
1922	453,000	1,395,911			

Through the kindness of M. W. Newcomb, secretary of the Barre Granite Manufacturers Association, the following figures covering the entire granite industry at Barre are given to supplement the figures of sales reported to the Bureau of Mines by the quarrymen:

Estimated output of monumental granite in Barre district, Vermont, 1923–1926

	1923	1924	1925	1926
Total quarry output, rough stock—cubic feet	1,254,714	1,127,850	1,161,684	1,169,322
Shipped out of Barre district in rough—do	251,996	225,570	232,336	233,884
Manufactured in Barre district—do	1,002,718	902,280	929,348	935,438
Light stock consumed in district—do	626,701	563,925	580,843	584,649
Dark stock consumed in district—do	376,017	338,355	348,505	350,789
Number of cutters in district	1,250	1,000	1,100	1,100
Average daily wage	$8.00	$8.00	$8.00	$8.00
Average number of days worked	270	250	275	272
Total pay roll for year	$2,700,000	$2,000,000	$2,420,000	$2,393,600
Estimated overhead	1,350,000	1,000,000	1,210,000	1,196,800
Estimated value of light stock	2,256,123	2,352,585	2,613,789	2,630,973
Estimated value of dark stock	1,940,246	2,023,223	1,873,215	1,885,533
Estimated polishing cost	600,000	585,500	735,000	739,830
Output from saws	250,000	248,000	245,000	246,610
Total value of granite	9,096,369	8,209,308	9,097,004	9,093,346

The figures of quantity submitted by Mr. Newcomb represent the stone carried from the quarries. The figures of the Bureau of Mines represent the sales of stone as reported by the quarrymen.

BASALT AND RELATED ROCKS (TRAP ROCK)

Basalt and related rocks sold or used by producers in 1926 increased 10 per cent in quantity and 8 per cent in value over 1925. Crushed stone, which is the chief product, increased 9 per cent in quantity and 8 per cent in value. Under "Other" is reported 83,910 short tons of roofing granules, valued at $611,415, made chiefly from altered diabase (greenstone). Included under granite and miscellaneous varieties of stone is also a small amount of "roofing granules," which increases the total amount of roofing granules made

from stone to 91,530 tons, valued at $626,583. Besides these "roofing granules," others of slate (including slate "flour") amounting to 498,050 tons, valued at $3,009,368, were sold by producers in 1926.

Basalt and related rocks (trap rock) sold or used by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone, cubic feet	532,000	$59,985	336,140	$31,107
Approximate equivalent in short tons	46,030		28,730	
Paving blocks, number	78,000	3,560	100,000	5,000
Approximate equivalent in short tons	780		600	
Rubble, short tons	47,930	95,210	111,070	166,904
Riprap, do	252,600	354,960	233,340	333,690
Crushed stone, do	11,419,220	13,695,249	12,494,260	14,781,858
Other (principally roofing granules), do	75,550	561,078	109,740	631,743
Total (quantities approximate, in short tons)	11,842,110	14,770,042	12,977,740	15,950,302

Basalt and related rocks (trap rock) sold or used by producers in the United States, 1925 and 1926, by States

[Quantities approximate]

State	1925		1926	
	Short tons	Value	Short tons	Value
Arkansas			(1)	(1)
California	2,090,720	$1,759,580	2,159,790	$1,810,893
Colorado	(1)	(1)	(1)	(1)
Connecticut	1,702,000	1,764,645	1,959,850	2,116,091
Hawaii	348,150	675,677	399,900	849,302
Idaho	193,590	219,755	144,350	163,359
Maryland	471,940	752,147	756,050	1,087,491
Massachusetts	1,104,180	1,291,751	1,066,870	1,329,609
Michigan	110,400	323,991	96,990	303,601
Minnesota	164,840	288,893	211,780	327,411
Montana	(1)	(1)	(1)	(1)
New Jersey	2,011,150	3,140,696	2,053,130	3,139,316
New York	(1)	(1)	(1)	(1)
Oregon	1,368,090	1,512,728	1,749,410	1,746,074
Pennsylvania	1,307,930	1,883,646	1,472,930	2,068,773
Texas	(1)	(1)	136,260	127,975
Virginia	71,490	108,724	57,770	107,005
Washington	456,670	445,212	343,770	318,846
Wisconsin	(1)	(1)	(1)	(1)
Undistributed	440,960	602,597	368,890	454,556
	11,842,110	14,770,042	12,977,740	15,950,302

[1] Included under "Undistributed."

Basalt and related rocks (trap rock) sold or used by producers in the United States in 1926, by States and uses

State	Number of active plants	Building, rough construction		Rubble and riprap		Crushed stone				Other uses		Total	
						Concrete and road metal		Railroad ballast					
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons (approximate)	Value
Arkansas	2			(1)	(1)							(1)	(1)
California	23	(1)	(1)	133,310	$79,479	1,748,130	$1,469,455	272,610	$196,748	(1)	(1)	2,159,790	$1,810,893
Colorado	1					(1)	(1)					(1)	(1)
Connecticut	15	(1)	(1)			1,800,680	1,954,402	145,370	158,197	(1)	(1)	1,959,850	2,116,091
Hawaii	11			111,570	325,600	286,030	521,381			2,300	$2,321	399,900	849,302
Idaho	11					144,350	163,359					144,350	163,359
Maryland	8	(1)	(1)			426,650	625,861	(1)	(1)			756,050	1,087,491
Massachusetts	19	6,600	$13,050	(1)	(1)	993,270	1,249,559	(1)	(1)			1,066,870	1,329,609
Michigan	6			(1)	(1)	68,810	100,288			(1)	(1)	96,990	303,601
Minnesota	4			(1)	(1)	122,780	146,974	(1)	(1)	(1)	(1)	211,780	327,411
Montana	1			(1)	(1)							(1)	(1)
New Jersey	32			(1)	(1)	1,819,750	2,831,887	232,320	301,832	(1)	(1)	2,053,130	3,139,316
New York	3					(1)	(1)	(1)	(1)			(1)	(1)
Oregon	84			38,900	35,779	1,268,840	1,386,584	441,070	318,711	600	5,000	1,749,410	1,746,074
Pennsylvania	26	7,850	13,759	(1)	(1)	976,010	1,270,046	430,020	527,936	(1)	(1)	1,472,930	2,068,773
Texas	1					19,410	28,652	116,850	99,323			136,260	127,975
Virginia	7					57,770	107,005					57,770	107,005
Washington	28			34,650	35,677	300,420	269,104	(1)	(1)	(1)	(1)	343,770	318,846
Wisconsin	1					(1)	(1)					(1)	(1)
Undistributed		14,280	4,298	25,980	24,059	238,800	299,295	584,320	755,259	107,440	629,422	368,890	454,556
	283	28,730	31,107	344,410	500,594	10,271,700	12,423,852	2,222,560	2,358,006	110,340	636,743	12,977,740	15,950,302

[1] Included under "Undistributed."

MARBLE

The total quantity of marble sold by producers in 1926 was virtually the same as in 1925, but the total value of the sales increased 2 per cent. The quantity of building stone sold was slightly more than in 1925 and the value somewhat less (2 per cent). Monumental stone decreased 7 per cent in quantity but increased 12 per cent in value. There was little change in the amount of marble sold as by-products or as waste material from the quarries.

Marble sold by producers in the United States, 1925 and 1926, by uses

Use		1925		1926	
		Quantity	Value	Quantity	Value
Building stone:					
Rough—					
Exterior	cubic feet	318,300	$664,791	345,840	$834,347
Interior	do	739,080	1,699,175	697,380	1,407,992
Finished—					
Exterior	do	827,390	2,894,895	778,150	2,516,087
Interior	do	980,530	4,341,250	1,046,570	4,661,513
Total exterior	do	1,145,690	3,559,686	1,123,990	3,350,434
Total interior	do	1,719,610	6,040,425	1,743,950	6,069,505
Total building stone	do	[1] 2,865,300	[1] 9,600,111	[1] 2,867,940	[1] 9,419,939
Monumental stone:					
Rough	do	214,270	177,159	138,710	140,414
Finished	do	961,820	3,421,748	956,510	3,907,443
Total monumental stone	do	[1] 1,176,090	[1] 3,598,907	[1] 1,095,220	[1] 4,047,857
Total building and monumental	cubic feet	4,041,390	13,199,018	3,963,160	13,467,796
	approximate short tons	333,130		335,950	
Marble for other uses (by-products)	short tons	231,020	683,439	227,220	699,684
Total marble, approximate short tons		564,150	13,882,457	563,170	14,167,480

[1] Building-stone figures may be somewhat less than given and monumental stone somewhat more, as some of the Tennessee producers were unable to divide their product according to use.

Marble sold by producers in the United States, 1925 and 1926, by States and uses

State	Building and monumental (rough and finished)		Other uses		Total	
	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1925						
Alabama	95,900	$538,803	28,060	$63,358	36,210	$602,161
California	37,660	112,103	5,570	23,057	8,780	135,160
Georgia	586,470	2,750,698	33,070	37,290	82,930	2,787,988
Massachusetts	37,860	185,909	2,050	3,665	5,280	189,574
Missouri	821,730	1,439,604	2,400	2,963	62,280	1,442,567
New York	65,600	167,226	66,630	343,674	72,270	510,900
Tennessee	863,560	2,403,407	39,950	75,156	112,840	2,478,563
Vermont	1,385,850	5,104,067	29,930	40,400	147,720	5,144,467
Other States [1]	146,760	497,201	23,360	93,876	35,840	591,077
	4,041,390	13,199,018	231,020	683,439	564,150	13,882,457
1926						
Alabama	123,580	704,524	23,520	69,459	34,020	773,983
California	38,820	119,461	5,120	19,575	8,420	139,036
Georgia	519,860	2,800,649	14,000	14,500	59,100	2,815,149
Massachusetts	30,810	148,508	1,430	2,488	4,030	150,996
Missouri	687,840	1,446,272	540	711	57,530	1,446,983
New York	99,620	282,493	72,070	390,829	80,730	673,322
Tennessee	934,770	2,427,897	45,290	53,427	124,130	2,481,324
Vermont	1,422,830	5,116,290	51,810	73,674	172,750	5,189,964
Other States [1]	105,030	421,702	13,440	75,021	22,460	496,723
	3,963,160	13,467,796	227,220	699,684	563,170	14,167,480

[1] 1925: Alaska, Arizona, Arkansas, Colorado, Maryland, New Jersey, North Carolina, Pennsylvania, Utah, and Virginia; 1926: Same States as in 1925, with Nevada and Washington in addition.

SERPENTINE

The figures showing sales of serpentine (verde antique) for interior and exterior building, dimension stone, and by-products are included in the figures for marble, but those showing sales of serpentine as crushed stone for road metal, ballast, riprap, and other low-grade material are included in the figures for "miscellaneous" stone. The States represented in the production of serpentine in 1926 are California, Maryland, Massachusetts, New Jersey, Pennsylvania, and Vermont.

Serpentine (verde antique) sold by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building and ornamental stone.....cubic feet	67,370	$502,248	58,430	$423,358
Rough construction, crushed, etc.....short tons	9,130	49,357	11,800	51,358
	----------	551,605	----------	474,716

LIMESTONE

The limestone sold or used by producers in 1926, as given in this report, increased 7 per cent in quantity and 11 per cent in value. Building stone, curbing, crushed stone, fluxing stone, and stone sold to glass factories, paper mills, and to many of the miscellaneous industries consuming limestone, as noted in the table on page 232, increased in both quantity and value. Rubble, riprap, stone for sugar factories, and agricultural limestone decreased in quantity, although the value of riprap and of agricultural limestone increased.

Limestone sold or used by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone [1].....cubic feet	15,983,800	$16,092,079	18,537,950	$20,391,597
Approximate equivalent in short tons	1,204,550	----------	1,394,220	----------
Curbing, flagging, and paving.....cubic feet	129,730	98,587	167,780	135,882
Approximate equivalent in short tons	11,730	----------	12,800	----------
Rubble.....short tons	324,630	513,387	254,240	476,545
Riprap.....do	1,847,330	1,406,714	1,815,550	1,898,951
Crushed stone.....do	51,337,840	52,446,110	56,267,040	57,436,179
Fluxing stone.....do	22,840,500	17,318,366	23,849,700	18,021,449
Sugar factories.....do	471,580	796,974	416,920	771,488
Glass factories.....do	324,160	412,832	326,280	543,163
Paper mills.....do	109,730	198,691	202,460	319,998
Agriculture.....do	1,954,480	2,880,589	1,850,620	3,064,235
Other uses [2].....do	5,222,910	5,843,699	5,498,070	6,192,812
Total (quantities approximate, in short tons)	85,649,440	98,008,028	91,887,900	109,252,299

[1] Figures for building stone include small amounts of monumental stone.
[2] See table on p. 232 for further distribution of limestone products.

Limestone sold or used by producers in the United States, 1925 and 1926, by States

[Quantities approximate]

State	1925		1926	
	Short tons	Value	Short tons	Value
Alabama	1,224,710	$1,250,742	1,212,890	$1,214,328
Arizona	(1)	(1)	(1)	(1)
Arkansas	50,710	51,829	52,090	57,725
California	264,690	545,749	198,490	454,770
Colorado	529,810	575,562	687,330	740,138
Connecticut	(1)	(1)	(1)	(1)
Florida	3,795,420	4,348,234	6,572,870	7,177,565
Georgia	189,770	385,152	225,300	411,921
Idaho	9,270	31,053	(1)	(1)
Illinois	8,518,410	7,686,005	9,145,180	8,479,277
Indiana	4,455,310	18,140,974	4,678,230	22,767,999
Iowa	805,140	870,230	938,520	897,262
Kansas	705,780	958,779	850,560	1,057,276
Kentucky	1,658,240	1,983,941	1,876,320	2,048,226
Louisiana	(1)	(1)	120,290	198,473
Maine	39,530	95,735	64,620	100,763
Maryland	389,910	582,663	393,230	576,862
Massachusetts	164,340	347,177	77,120	327,324
Michigan	11,460,000	6,327,634	10,788,740	6,411,828
Minnesota	458,920	1,218,608	379,520	1,096,023
Mississippi	(1)	(1)	(1)	(1)
Missouri	2,720,080	4,082,920	2,997,940	4,410,180
Montana	210,760	160,207	196,180	155,148
Nebraska	135,910	225,669	105,740	185,057
Nevada	(1)	(1)	18,920	32,789
New Jersey	237,100	338,037	218,640	353,605
New Mexico	(1)	(1)		
New York	8,488,910	10,149,440	9,163,560	10,955,863
North Carolina	148,530	238,310	221,650	335,020
Ohio	11,493,960	9,617,437	12,716,170	10,675,736
Oklahoma	1,372,040	1,414,241	1,496,350	1,321,188
Oregon	(1)	(1)	15,120	29,044
Pennsylvania	13,033,880	13,630,050	13,250,290	13,447,371
Porto Rico	73,460	113,515	71,630	111,291
Rhode Island	(1)	(1)	(1)	(1)
South Dakota	73,080	97,880	72,570	94,617
Tennessee	1,722,310	1,856,328	1,568,950	1,688,692
Texas	2,495,440	1,898,185	2,907,770	2,210,828
Utah	877,240	441,529	365,880	346,012
Vermont	30,050	108,755	40,280	145,584
Virginia	2,252,300	2,611,157	2,531,350	2,736,956
Washington	44,280	55,904	67,940	78,643
West Virginia	3,114,280	2,998,579	3,029,150	3,013,437
Wisconsin	2,105,260	2,079,512	2,344,710	2,478,929
Wyoming	133,410	245,058	148,220	305,383
Undistributed	167,200	245,248	77,590	123,166
	85,649,440	98,008,028	91,887,900	109,252,299

[1] Included under "Undistributed"

Limestone sold or used by producers in the United States in 1926, by States and uses

State	Number of active plants	Building[1]						Rubble		Riprap		Crushed stone			
		Rough construction		Rough architectural		Finished (sawed and cut)						Concrete and road metal		Railroad ballast	
		Short tons	Value	Cubic feet	Value	Cubic feet	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	12	250	$1,512	52,440	$40,000	83,200	$89,448			15,950	$13,059	62,540	$64,013	140,680	$75,155
Arizona	2											(2)	(2)		
Arkansas	5											46,410	51,498	(2)	(2)
California	23	390	770					(2)	(2)	(2)	(2)	58,760	81,759		
Colorado	21			(2)	(2)					(2)	(2)	(2)	(2)	(2)	(2)
Connecticut	2											(2)	(2)		
Florida	45	(2)	(2)							(2)	(2)	6,154,380	6,608,395	147,350	197,401
Georgia	9											133,700	148,762	(2)	(2)
Idaho	2														
Illinois	70	15,670	19,148					9,850	$15,565	491,920	498,684	6,225,070	5,556,093	1,020,170	803,130
Indiana	97			5,762,900	3,519,156	8,707,680	15,315,013	12,040	31,078	139,880	57,659	2,586,950	2,973,064	502,470	419,534
Iowa	27							6,150	7,161	91,150	87,756	627,290	599,490	75,090	69,670
Kansas	45	2,100	12,296			(2)	(2)	11,550	18,401	14,230	17,806	636,650	850,115	174,590	129,159
Kentucky	63	3,770	9,014	135,810	64,708			(2)	(2)	35,110	48,811	1,184,480	1,357,673	567,830	450,692
Louisiana	1									25,000	41,250	76,690	126,533	18,600	30,690
Maine	4											(2)	(2)		
Maryland	19	23,450	32,560	(2)	(2)							301,980	408,402	(2)	(2)
Massachusetts	6											(2)	(2)		
Michigan	20	6,250	2,851							100,920	45,132	1,184,300	1,115,335	21,650	10,050
Minnesota	17	3,960	7,100	136,940	170,501	125,080	492,313	5,570	11,225	63,930	38,961	255,750	321,935		
Mississippi	2														
Missouri	111	5,020	3,440					184,780	327,105	431,800	591,483	2,151,580	3,107,147	81,980	78,400
Montana	4											28,390	25,169		
Nebraska	6	(2)	(2)							6,430	7,413	56,970	65,121		
Nevada	1														
New Jersey	8									600	1,200	20,640	25,988		
New York	75	74,330	78,740			(2)	(2)	(2)	(2)	56,200	82,000	6,728,660	8,276,518	1,035,460	946,909
North Carolina	5											170,040	232,104		
Ohio	107	24,200	39,864					(2)	(2)	(2)	(2)	6,486,320	5,554,676	2,590,970	2,142,460
Oklahoma	18	(2)	(2)			(2)	(2)	(2)	(2)	67,250	53,971	872,850	870,271	545,470	369,877
Oregon	3														
Pennsylvania	251	22,730	34,616									3,830,210	4,879,478	137,540	149,578
Porto Rico	13	(2)	(2)							(2)	(2)	66,030	102,215	3,380	3,627
Rhode Island	1														
South Dakota	10											61,570	77,736		
Tennessee	26									7,020	16,968	689,250	648,686	688,000	567,035
Texas	23	(2)	(2)	(2)	(2)	(2)	(2)			67,650	66,803	1,175,780	971,994	1,529,320	822,548

Utah	13	(2)	(2)	(2)	(2)					98,020	87,208	(2)	(2)		
Vermont	5											(2)	(2)		
Virginia	70	(2)	(2)					(2)	(2)			967,410	1,165,853	1,149,810	1,013,928
Washington	7	(2)	(2)									(2)	(2)		
West Virginia	22											603,330	543,624	128,620	122,576
Wisconsin	100	30,120	42,160			12,370	20,873	13,990	46,459	60,580	65,576	1,729,600	1,725,582	277,390	213,555
Wyoming	9	(2)	(2)											3,120	2,662
Undistributed		76,520	96,060	73,300	42,716	86,760	256,738	10,310	19,551	41,910	77,211	63,770	115,407	190,200	166,927
	1,385	288,760	380,131	6,161,390	3,837,081	9,015,090	16,174,385	254,240	476,545	1,815,550	1,898,951	45,237,350	48,650,616	11,029,690	8,785,563

[1] Figures for building stone include small amounts for monumental work.

[2] Included under "Undistributed."

Limestone sold or used by producers in the United States in 1926, by States and uses—Continued

State	Fluxing stone		Sugar factories		Glass factories		Paper mills		Agriculture		Other uses		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons (approximate)	Value
Alabama	968,820	$897,109							(2)	(2)	(2)	(2)	1,212,890	$1,214,328
Arizona	(2)	(2)											(2)	(2)
Arkansas									(2)	(2)	(2)	(2)	52,090	57,725
California	31,150	64,187	(2)	(2)	6,800	$16,300			11,480	$40,285	86,610	$246,865	198,490	454,770
Colorado	460,420	449,232	90,160	$174,109							(2)	(2)	687,330	740,138
Connecticut	(2)	(2)							(2)	(2)			(2)	(2)
Florida											228,900	279,311	6,572,870	7,177,565
Georgia	(2)	(2)							15,650	27,792	49,610	211,868	225,300	411,921
Idaho	(2)	(2)							(2)	(2)	(2)	(2)	(2)	(2)
Illinois	673,340	618,928			8,700	10,875			562,060	616,972	138,400	339,882	9,145,180	8,479,277
Indiana	192,210	101,786			(2)	(2)			102,160	137,275	(2)	(2)	4,678,230	22,767,999
Iowa	14,280	17,677	9,860	13,888					114,700	101,620			938,520	897,262
Kansas									4,800	5,618	(2)	(2)	850,560	1,057,276
Kentucky	(2)	(2)							33,070	38,919	29,080	70,715	1,876,320	2,048,226
Louisiana													120,290	198,473
Maine	(2)	(2)					(2)	(2)	(2)	(2)	(2)	(2)	64,620	100,763
Maryland	(2)	(2)							2,210	7,510	(2)	(2)	393,230	576,862
Massachusetts	(2)	(2)							36,480	201,714	10,990	56,162	77,120	327,324
Michigan	6,627,090	3,443,921	(2)	(2)	(2)	(2)	72,370	$97,597	168,980	159,135	2,502,270	1,414,530	10,788,740	6,411,828
Minnesota									24,300	24,582	5,350	29,406	379,520	1,096,023
Mississippi									(2)	(2)			(2)	(2)
Missouri	9,310	11,952	(2)	(2)	(2)	(2)			57,000	71,523	47,750	170,428	2,997,940	4,410,180
Montana	147,020	93,091	(2)	(2)	(2)	(2)							196,180	155,148
Nebraska			(2)	(2)					15,860	19,815	21,980	84,208	105,740	185,057
Nevada	12,750	22,619	5,100	8,669	1,070	1,501							18,920	32,789
New Jersey	136,120	129,884							35,030	100,901	26,250	95,632	218,640	353,605
New York	230,950	222,666					19,700	32,130	82,830	241,007	933,140	1,014,393	9,163,560	10,955,863
North Carolina	(2)	(2)							40,410	80,812	(2)	(2)	221,650	335,020
Ohio	2,851,980	1,951,479	22,000	31,900	57,740	71,575	8,600	7,034	175,320	276,098	492,040	584,650	12,716,170	10,675,736
Oklahoma					6,130	11,029			(2)	(2)	(2)	(2)	1,496,350	1,321,188
Oregon							12,160	25,343	2,960	3,701			15,120	29,044
Pennsylvania	8,694,870	7,371,706			81,880	130,467	30,350	37,885	78,150	307,847	374,560	535,794	13,250,290	13,447,371
Porto Rico									330	1,473	1,090	3,276	71,630	111,291
Rhode Island	(2)	(2)											(2)	(2)
South Dakota			10,940	16,481					60	400			72,570	94,617
Tennessee	18,670	19,724							76,720	170,824	89,290	265,455	1,568,950	1,688,692
Texas	(2)	(2)			(2)	(2)			1,340	1,470	(2)	(2)	2,907,770	2,210,828
Utah	230,130	178,479	35,260	73,152							(2)	(2)	365,880	346,012
Vermont	(2)	(2)									(2)	(2)	40,280	145,584
Virginia	95,360	101,955					(2)	(2)	46,670	74,029	260,700	364,457	2,531,350	2,736,956

Wash ngton	28,370	17,123					24,990	50,032	(2)	(2)	(2)	(2)	67,940	78,643
West Virginia	2,155,410	2,061,679			(2)	(2)			22,820	68,133	(2)	(2)	3,029,150	3,013,437
Wisconsin	87,550	79,891							103,420	170,642	41,040	114,191	2,344,710	2,478,929
Wyoming	(2)	(2)	143,750	296,995	(2)	(2)							148,220	305,383
Undistributed	183,900	166,361	99,850	156,294	163,960	301,416	34,290	69,977	35,810	114,138	171,820	447,471	77,590	123,166
	23,849,700	18,021,449	416,920	771,488	326,280	543,163	202,460	319,998	1,850,620	3,064,235	5,510,870	6,328,694	91,887,900	109,252,299

[2] Included under "Undistributed."

Limestone sold or used by producers in the United States for miscellaneous uses, 1925 and 1926

Use	1925		1926	
	Short tons	Value	Short tons	Value
Alkali works	3,549,930	$2,486,883	3,556,490	$2,354,040
Asphalt filler	390,140	1,399,574	415,920	1,415,352
Calcium carbide works	308,660	203,506	357,450	234,889
Carbonic acid works	33,900	61,200	(1)	(1)
Coal mine dusting	15,550	65,746	26,620	92,200
Magnesia works (dolomite)	98,980	131,440	72,850	110,560
Mineral food	6,080	30,204	13,030	55,207
Mineral (rock) wool	12,660	14,308	18,880	19,448
Poultry grit	17,050	104,865	17,450	109,776
Refractory stone (dolomite)	415,710	375,315	511,300	458,802
Road base	(1)	(1)	217,170	233,578
Roofing gravel	11,950	18,570	8,290	16,366
Stucco, terrazzo, and artificial stone [2]	53,440	244,427	82,340	358,455
Whiting substitute	82,290	511,406	95,650	549,139
Other uses [3]	226,570	196,255	104,630	185,000
	5,222,910	5,843,699	5,498,070	6,192,812

[1] Included under "Other uses."
[2] Artificial stone included under "Other uses" for 1925.
[3] Includes stone for ammonia, baking powder, filter stone, lime burners, nitrates, phosphates, powder, purification of copper, reduction of aluminum ore, soap, sulphuric acid, and uses not specified.

A considerable quantity of the limestone reported in the tables by uses is burned into lime—particularly the limestone reported by iron and steel producers and by alkali, sugar, and paper manufacturers as quarried by them and used in their own plants; also limestone sold to manufacturers of these and other commodities, who may burn it into lime before using it. To avoid duplication, this lime is not included in the figures of production in the chapter on lime. Limestone manufactured into lime and into cement and reported in terms of finished product is treated in separate chapters. The quantities so used are estimated in the following table:

Limestone used for all purposes in the United States, 1923–1926, in short tons

Use	1923	1924	1925	1926
Limestone (as given in this report)	76,701,360	75,894,430	85,649,440	91,887,900
Portland cement (including "cement rock")	34,722,000	37,727,000	40,720,000	41,583,000
Natural cement ("cement rock")	212,000	236,000	292,000	391,000
Lime	8,140,000	8,144,000	9,100,000	9,121,000
	119,775,360	122,001,430	135,761,440	142,982,900

BUILDING STONE

Of the total quantity of building stone reported in 1926, 55 per cent was limestone, which increased 16 per cent in quantity over 1925. The high-grade limestone classed as architectural building stone is obtained from a few well-known localities. Such figures as are available covering the output of these districts for a series of years are given in the following tables.

Alabama.—Oolitic limestone is quarried at Rockwood, near Russellville, Franklin County, by the Rockwood Stone Co. Besides its well-known use as a building stone, it is also sold for flux, riprap, rubble, agricultural limestone, and other purposes.

Limestone sold by producers at Russellville, Franklin County, Ala., 1917–1926

Year	Construction (rough and dressed)		Other		Total	
	Cubic feet	Value	Short tons	Value	Short tons (approximate	Value
1917	83,000	$36,760	118,800	$68,444	125,000	$105,204
1918	30,600	35,060	63,000	42,556	65,000	77,500
1919	27,000	41,000	110,000	106,000	112,000	147,000
1920	25,300	25,291	143,000	162,643	145,000	187,934
1921	50,500	55,530	15,000	15,533	19,000	71,063
1922	50,000	56,845	97,000	72,101	101,000	128,946
1923	60,000	54,000	184,800	148,500	189,600	202,500
1924	45,520	78,987	96,560	76,505	109,000	155,492
1925	145,510	129,116	156,610	128,842	198,000	257,958
1926	135,600	129,448	137,200	124,589	148,400	254,037

Indiana.—The largest quarry center for building limestone in the United States is the Bedford-Bloomington district in Lawrence and Monroe Counties. In 1926 the output of building stone in this district increased 20 per cent. In May, 1926, the Indiana Limestone Co. purchased and started to operate the quarries and mills of the Bowman-King Stone Co., Clear Creek Quarries Co., Consolidated Stone Co., Crescent Stone Co., Doyle Stone Co., Furst-Kerber Cut Stone Co., J. Hoadley & Sons Co., Hoadley Stone Co., Hunter Valley Stone Co., Imperial Stone Co., Indiana Quarries Co., W. McMillan & Son, Mathers Stone Co., Monroe County Oolitic Stone Co., National Stone Co., Shea & Donnelly Co. (Inc.), Star Stone Co., and United Indiana Stone Co. Other quarry operators in the district are Ingalls Stone Co. and Reed Powers Cut Stone Co., Bedford; Bloomington & Ellettsville Stone Co., Chicago & Bloomington Stone Co., Empire Stone Co., Hunter Bros. Stone Co., Indiana Oolitic Limestone Co., Maple Hill Quarries Co., Perry Stone Co., and Shawnee Stone Co., Ellettsville; Indianapolis Oolitic Stone Co. and Swenson Stone Co., Stinesville; and Victor Oolitic Stone Co., Victor.

Limestone sold by producers in the Bedford-Bloomington district, Lawrence and Monroe Counties, Ind., 1917–1926

Year	Construction		Other		Total	
	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1917	6,774,674	$3,261,107	210,326	$123,003	702,000	$3,384,110
1918	2,701,745	1,820,167	221,078	140,987	417,000	1,961,154
1919	4,788,639	3,787,151	174,463	159,181	522,000	3,946,332
1920	6,343,536	7,286,679	278,235	293,200	738,000	7,579,879
1921	5,297,458	6,815,859	141,068	146,425	525,000	6,962,284
1922	9,616,670	11,288,823	214,722	139,233	912,000	11,428,056
1923	11,694,380	15,248,164	233,180	167,845	1,081,080	15,416,009
1924	11,005,570	14,164,241	255,930	200,512	1,053,730	14,364,753
1925	11,803,890	14,203,120	290,990	170,772	1,146,790	14,373,892
1926	14,171,490	18,063,148	405,630	354,703	1,432,480	18,417,851

Limestone sold by producers in the Bedford-Bloomington district, Lawrence and Monroe Counties, Ind., 1925 and 1926, by classes

Class		1925		1926	
		Quantity	Value	Quantity	Value
Construction:					
Rough blocks	cubic feet	5,168,780	$3,109,746	5,747,510	$3,510,665
Sawed	do	4,431,660	4,529,272	4,982,780	4,654,126
Semifinished	do	234,490	447,853	513,460	1,047,692
Cut	do	1,968,960	6,116,249	2,927,740	8,850,665
Total construction	do	11,803,890	14,203,120	14,171,490	18,063,148
Other stone	short tons	290,990	170,772	405,630	354,703
Grand total (quantities approximate, in short tons)		1,146,790	14,373,892	1,432,480	18,417,851

A considerable amount of stone is sold by the quarry operators to the finishing mills of the district. The dressed stone sold by these mills is shown in the following tables:

Indiana oolitic limestone sold by mills not operated by quarry companies in the Bedford-Bloomington district, Lawrence and Monroe Counties, Ind., 1917–1926 [1]

Year	Cubic feet	Value	Year	Cubic feet	Value
1917	1,471,101	$1,788,405	1922	1,508,100	$3,706,900
1918	624,736	647,851	1923	1,676,500	4,805,537
1919	686,712	1,156,168	1924	1,754,500	4,654,145
1920	836,298	2,112,384	1925	2,087,860	5,629,269
1921	1,030,177	2,691,931	1926	1,511,250	4,073,271

[1] Includes some stone purchased by quarry operators and milled and resold.

Indiana oolitic limestone sold by mills not operated by quarry companies in the Bedford-Bloomington district, Lawrence and Monroe Counties, Ind., 1925 and 1926, by classes [1]

Year	Sawed		Semifinished		Cut		Total	
	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value
1925	482,380	$492,587	25,930	$44,885	1,579,550	$5,091,797	2,087,860	$5,629,269
1926	[2] 402,250	[2] 414,416	(2)	(2)	1,109,000	3,658,855	1,511,250	4,073,271

[1] Includes some stone purchased by quarry operators and milled and resold.
[2] Semifinished stone included under sawed stone.

The apparent decrease for 1926 as compared with 1925 in the sales by the mills not operated by quarry companies is accounted for by the purchase in May, 1926, of several of the mills of the district by the Indiana Limestone Co., Bedford. The mills purchased were operated in connection with the quarries of this company, and their output from June to December, 1926, is not included in the preceding table. The mills of this class taken over by the company were those of the Brooks Cut Stone Co., C. D. Donato Cut Stone Co., Hoosier Cut Stone Co., Inter-State Cut Stone Co., John A. Rowe Cut Stone Co., and Henry Struble Cut Stone Co. Mills were also operated in 1926 by the Bedford Cut Stone Co. and J. P. Falt Co.,

Bedford; Central Oolitic Stone Co., Hoadley, Cline Co., Matthews Bros. Co., Walker Bros. Stone Co., and H. A. Woolery & Son, Bloomington; and Harding & Cogswell (Inc.), Mutual Oolitic Cut Stone Co., and A. J. Thompson Cut Stone Co., Ellettsville.

Kentucky.—The oolitic limestone quarried at Bowling Green, Warren County, Ky., chiefly by the Bowling Green Quarries Co., is well known to the building trade. The following table shows the production of the county for the last 10 years:

Limestone sold by producers in Warren County, Ky., 1917–1926

Year	Building and monumental stone (rough and dressed)		Other		Total	
	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1917	201,582	$107,279	22,537	$20,240	39,000	$127,519
1918	88,580	58,732	2,470	2,684	9,800	61,416
1919	103,320	100,817	7,540	10,732	16,500	111,549
1920	98,700	123,010	7,480	12,420	15,600	135,430
1921	128,000	170,540	6,230	5,840	16,800	176,380
1922	91,400	143,012	5,200	7,000	12,740	150,012
1923	65,980	113,040	24,380	28,915	29,660	141,955
1924	65,630	120,882	10,000	10,000	14,920	130,882
1925	128,700	226,646	27,200	61,260	37,500	287,906
1926	[1] 134,460	[1] 63,458	10,340	10,130	21,000	73,588

[1] Rough blocks only.

Minnesota.—The following table shows the sales of limestone at Mankato and Kasota, Minn., for the last 10 years:

Limestone sold by producers at Mankato and Kasota, Minn., 1917–1926

Year	Building stone (rough and dressed)		Other		Total	
	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1917	97,002	$112,469	[1]	[1]	[1]	[1]
1918	85,998	95,615	36,892	$28,745	44,000	$124,360
1919	57,959	108,250	46,131	60,007	50,760	168,257
1920	104,865	132,170	39,564	54,485	47,900	186,655
1921	111,487	271,230	32,627	41,409	41,500	312,639
1922	151,110	261,275	29,910	32,329	42,600	293,604
1923	138,890	312,911	33,980	34,867	44,900	347,778
1924	130,660	495,036	46,610	43,152	65,560	538,188
1925	320,050	586,451	66,060	60,179	91,380	646,630
1926	245,330	638,284	58,050	32,655	77,410	670,939

[1] Figures not available.

T. R. Coughlan Co. and Fowler & Pay furnished the building stone from the Mankato quarries and Babcock & Willcox and Breen Stone & Marble Co. that from the Kasota quarries. The Mantorville Stone Co., Mantorville, and the Biesanz Stone Co. and George Haun Stone Co., Winona, also furnished architectural building stone.

Missouri.—The stone quarried at Carthage, Jasper County, Mo., used for architectural building and monumental stone is classed as marble and is included in the figures of production of marble in Missouri given on page 225. Its chief use is, however, as is that of the Indiana stone, mainly for exterior building, and the figures of production are given here for convenience in comparison. The crushed stone and low-grade material are included under limestone, but all grades are combined to show the total production.

It is understood that the quarry companies furnishing the high-grade stone have combined and will hereafter do business as the Missouri Marble Corporation, Carthage.

Limestone and marble sold by producers in the Carthage district, Jasper County, Mo., 1917–1926

Year	Building stone (rough and dressed)		Monumental stone (rough and dressed)		Other		Total	
	Cubic feet	Value	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1917	313,904	$302,411	49,819	$58,809	[1] 36,000	$31,223	[1] 70,600	$392,443
1918	236,885	239,418	26,387	31,798	[1] 48,000	68,682	[1] 70,820	339,898
1919	231,573	399,381	62,482	77,117	44,817	84,025	69,500	560,523
1920	295,341	589,213	86,791	158,440	56,292	190,529	129,700	938,182
1921	279,560	587,301	31,551	77,421	46,751	152,521	72,600	817,243
1922	368,400	692,693	26,330	40,471	68,550	176,852	102,300	910,016
1923	442,680	782,796	20,630	32,243	66,070	167,357	104,760	982,396
1924	435,810	826,294	25,660	40,505	78,030	193,944	116,560	1,060,743
1925	478,210	1,012,930	38,810	85,321	224,270	304,913	267,450	1,403,164
1926	426,950	975,754	32,630	80,698	127,330	220,780	165,700	1,277,232

[1] Estimated.

SANDSTONE

There was an increase of 11 per cent in the quantity and of 2 per cent in the value of sandstone in 1926. Sandstone for flagging, crushed stone, riprap, and refractory stone (ganister) increased in quantity, and that for building, paving blocks, curbing, rubble, and miscellaneous uses decreased.

Sandstone sold or used by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone—cubic feet	3,474,160	$2,813,094	3,346,550	$3,154,207
Approximate equivalent in short tons	259,600		249,360	
Paving blocks—number	2,390,290	191,413	2,315,180	171,275
Approximate equivalent in short tons	21,970		25,450	
Curbing—cubic feet	3,201,320	2,375,029	2,085,570	1,780,080
Approximate equivalent in short tons	237,400		154,520	
Flagging—cubic feet	762,280	562,344	854,424	642,469
Approximate equivalent in short tons	55,790		62,600	
Crushed stone—short tons	2,250,910	2,772,823	2,835,010	3,300,859
Riprap—do	232,420	216,867	571,280	592,844
Rubble—do	406,110	574,243	52,450	91,678
Refractory stone (ganister)—do	807,380	1,018,394	984,470	1,321,824
Other uses—do	207,750	395,809	43,390	93,793
Total (quantities approximate, in short tons)	4,479,330	10,920,016	4,978,530	11,149,029

Sandstone sold or used by producers in the United States, 1925 and 1926, by States

[Quantities approximate]

State	1925		1926	
	Short tons	Value	Short tons	Value
Alabama	131,870	$289,692	49,530	$59,882
Arizona	(1)	(1)	(1)	(1)
Arkansas	(1)	(1)	35,360	47,605
California	782,730	939,246	865,010	926,217
Colorado	29,220	63,268	46,470	71,085
Connecticut	12,690	40,327	17,180	17,126
Idaho	57,610	116,200	29,970	124,350
Illinois	58,420	36,678	(1)	(1)
Indiana	(1)	(1)	21,000	29,190
Kansas	(1)	(1)	(1)	(1)
Kentucky	44,770	143,563	31,640	119,957
Louisiana			2,580	9,410
Massachusetts	(1)	(1)	(1)	(1)
Michigan	28,280	20,179	(1)	(1)
Minnesota	68,780	154,901	59,580	122,842
Montana	5,350	14,394	49,160	31,218
New Jersey	34,030	50,168	(1)	(1)
New Mexico	(1)	(1)	(1)	(1)
New York	[2] 211,170	[2] 1,348,455	[2] 144,700	[2] 1,171,885
Ohio	516,550	3,467,135	386,970	3,087,471
Oklahoma	2,020	5,190	(1)	(1)
Oregon	(1)	(1)	374,300	363,294
Pennsylvania	[2] 1,351,140	[2] 2,235,726	[2] 1,502,490	[2] 2,625,730
South Dakota	134,810	196,607	133,530	196,231
Tennessee	(1)	(1)	(1)	(1)
Texas	(1)	(1)	65,200	69,450
Utah	(1)	(1)	(1)	(1)
Vermont	(1)	(1)		
Virginia	124,340	169,157	126,510	157,444
Washington	29,690	447,056	13,730	455,045
West Virginia	233,920	350,564	182,500	388,890
Wisconsin	190,340	381,905	254,460	523,564
Wyoming	(1)	(1)	5,720	11,080
Undistributed	431,600	449,605	580,940	540,063
	4,479,330	10,920,016	4,978,530	11,149,029

[1] Included under "Undistributed."

[2] Includes bluestone.

Sandstone sold or used by producers in the United States in 1926, by States and uses

State	Number of active plants	Building						Refractory stone (ganister)		Paving blocks		Curbing	
		Rough construction		Rough architectural		Dressed (sawed and cut)							
		Short tons	Value	Cubic feet	Value	Cubic feet	Value	Short tons	Value	Number	Value	Cubic feet	Value
Alabama	4							(1)	(1)				
Arizona	2							(1)	(1)				
Arkansas	4												
California	11							(1)	(1)				
Colorado	11	(1)	(1)	(1)	(1)			22,880	$32,867	(1)	(1)		
Connecticut	3	(1)	(1)										
Idaho	3					(1)	(1)						
Illinois	2							(1)	(1)				
Indiana	1												
Kansas	2												
Kentucky	4	(1)	(1)			(1)	(1)						
Louisiana	1												
Massachusetts	1			(1)	(1)	(1)	(1)						
Michigan	2			(1)	(1)								
Minnesota	6			8,110	$8,112	2,200	$4,391			29,400	$2,690		
Montana	6	(1)	(1)	(1)	(1)			(1)	(1)				
New Jersey	1	(1)	(1)	(1)	(1)								
New Mexico	1												
New York	33	1,720	$1,385	4,180	5,295	107,620	244,978			886,620	54,246	631,220	$671,439
Ohio	14	1,560	2,636	587,560	291,350	1,159,470	1,199,258	21,140	56,705			1,324,870	985,224
Oklahoma	2	(1)	(1)										
Oregon	3												
Pennsylvania	94	46,490	73,470	141,300	151,903	29,940	153,470	675,290	846,916	1,384,160	113,376	129,480	123,417
South Dakota	7			60,000	18,000	3,500	14,500	(1)	(1)	(1)	(1)		
Tennessee	2							(1)	(1)				
Texas	1	1,200	1,500										
Utah	2							(1)	(1)				
Virginia	8			13,760	13,759	11,980	28,049						
Washington	3	110	157			151,200	449,952						
West Virginia	18	(1)	(1)					(1)	(1)				
Wisconsin	17	2,600	3,460	32,950	32,572	27,230	110,725	176,560	243,010				
Wyoming	3												
Undistributed		10,360	14,584	42,120	34,145	153,650	296,556	88,600	142,326	15,000	963		
	272	64,040	97,192	889,980	555,136	1,646,790	2,501,879	984,470	1,321,824	2,315,180	171,275	2,085,570	1,780,080

State	Flagging		Rubble		Riprap		Crushed stone				Other uses		Total	
							Concrete and road metal		Railroad ballast					
	Cubic feet	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons (approximate)	Value
Alabama			(1)	(1)									49,530	$59,882
Arizona					(1)	(1)							(1)	(1)
Arkansas					16,840	$33,000	17,520	$14,275	1,000	$330			35,360	47,605
California			(1)	(1)	51,610	67,096	763,240	813,251	10,650	14,899	32,270	$5,976	865,010	926,217
Colorado	(1)	(1)	(1)	(1)	4,510	5,731	16,100	24,800					46,470	71,085
Connecticut					(1)	(1)	13,500	13,500					17,180	17,126
Idaho	(1)	(1)	(1)	(1)			(1)	(1)					29,970	124,350
Illinois							(1)	(1)					(1)	(1)
Indiana					21,000	29,190							21,000	29,190
Kansas	(1)	(1)					(1)	(1)					(1)	(1)
Kentucky							(1)	(1)	(1)	(1)	(1)	(1)	31,640	119,957
Louisiana					2,580	9,410							2,580	9,410
Massachusetts			(1)	(1)									(1)	(1)
Michigan							(1)	(1)					(1)	(1)
Minnesota			900	$763			53,480	78,441			4,100	28,445	59,580	122,842
Montana					5,170	5,552			38,610	11,535			49,160	31,218
New Jersey													(1)	(1)
New Mexico									(1)	(1)	(1)	(1)	(1)	(1)
New York	113,440	$96,185	5,100	7,700	4,150	3,153	55,400	87,504					144,700	1,171,885
Ohio	654,326	456,533	15,970	27,300	44,430	29,172	40,150	38,464	2,890	829			386,970	3,087,471
Oklahoma			(1)	(1)									(1)	(1)
Oregon					(1)	(1)	(1)	(1)					374,300	363,294
Pennsylvania	73,628	83,859	10,830	29,183	7,690	1,584	595,560	905,162	119,360	143,390			1,502,490	2,625,730
South Dakota			(1)	(1)	(1)	(1)	116,620	148,855			560	2,800	133,530	196,231
Tennessee													(1)	(1)
Texas					5,000	6,000	59,000	61,950					65,200	69,450
Utah									(1)	(1)			(1)	(1)
Virginia							59,160	83,236	65,480	32,400			126,510	157,444
Washington			80	165	2,200	4,771							13,730	455,045
West Virginia							176,080	383,654					182,500	388,890
Wisconsin			(1)	(1)	1,740	1,117	54,660	66,485			(1)	(1)	254,460	523,564
Wyoming			(1)	(1)	(1)	(1)	(1)	(1)					5,720	11,080
Undistributed	13,030	5,892	19,570	26,567	404,360	397,068	104,460	99,171	472,150	278,728	6,460	56,572	580,940	540,063
	854,424	642,469	52,450	91,678	571,280	592,844	2,124,870	2,818,748	710,140	482,111	43,390	93,793	4,978,530	11,149,029

[1] Included under "Undistributed."

BLUESTONE

The figures for bluestone are included in those for sandstone, but, on account of the local importance of this stone, they are also given separately. Except for a few of the large quarries, the Bureau of Mines uses the figures of sales reported by dealers, rather than those of the quarrymen, as more nearly representative of this industry. Stone for building and curbing decreased in quantity and value and that for flagging, the other important product, increased.

Bluestone sold in New York and Pennsylvania, 1925–26

State	Building stone		Curbing		Flagging		Other		Total	
	Cubic feet	Value	Cubic feet	Value	Cubic feet	Value	Short tons	Value	Short tons (approximate)	Value
1925										
New York	171,800	$263,872	531,790	$378,031	98,870	$76,203	20,550	$22,999	86,770	$741,105
Pennsylvania	9,420	6,090	125,960	129,736	49,460	56,653	14,500	3,476	30,120	195,955
	181,220	269,962	657,750	507,767	148,330	132,856	35,050	26,475	116,890	937,060
1926										
New York	129,890	249,308	277,520	357,047	110,940	94,885	17,600	26,953	61,390	728,193
Pennsylvania	11,800	11,847	91,310	92,498	71,180	80,012	5,500	844	20,220	185,201
	141,690	261,155	368,830	449,545	182,120	174,897	23,100	27,797	81,610	913,394

MISCELLANEOUS STONE

The material included under "miscellaneous" stone is used mainly for road metal, concrete, and railroad ballast. In 1926, there was a decrease of 9 per cent in the quantity and 6 per cent in the value of miscellaneous stone as reported. Crushed stone decreased 8 per cent in quantity and 4 per cent in value.

The State contributing the largest amount of miscellaneous stone is California. The output of this State includes rhyolite tuff (used as a building stone), andesite, rhyolite, trachyte, and other light-colored volcanic rocks, decomposed granite, hornblende-mica schist, and stone crushed from bowlders taken from river beds. The crushed bowlders are mostly from Los Angeles County, where part of the material taken out is sand, part screened gravel, and the rest chiefly bowlders which are crushed. The sand and screened gravel obtained are included in the report on sand and gravel. Among the varieties of stone reported are argillite quarried in Arkansas, New Jersey, and Pennsylvania; phonolite from m e dumps in Colorado; cherty limestone or flint rock in Florida; rhy te in Missouri; slate, conglomerate, and light-colored volcanic ro s in Massachusetts; and mica schist for building and refractory s one in Pennsylvania. There are also included from the other States volcanic cinders, coral rock, rhyolite, andesite, decomposed granite, mica crystal grit, serpentine, field stone, and some stone of unknown kinds reported by local contractors or operators of portable crushers at temporary quarry sites.

Miscellaneous varieties of stone [1] sold or used by producers in the United States, 1925 and 1926, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone—cubic feet	324,650	$64,963	196,930	$42,488
Approximate equivalent in short tons	24,850		16,570	
Riprap and rubble—short tons	327,950	740,284	245,020	633,140
Crushed stone—do	4,839,410	5,083,347	4,450,150	4,893,979
Refractory stone (mica schist)—do	38,040	154,481	35,300	145,206
Other uses—do	11,890	61,827	11,590	30,144
Total (quantities approximate, in short tons)	5,242,140	6,104,902	4,758,630	5,744,957

[1] Includes mica schist, conglomerate, argillite, various light-colored volcanic rocks, serpentine not used as marble, and such other stone as can not be properly classed in any of the main groups.

Miscellaneous varieties of stone sold or used by producers in the United States, 1925 and 1926, by States

[Quantities approximate]

State	1925		1926	
	Short tons	Value	Short tons	Value
Arizona	(1)	(1)	32,000	$42,167
Arkansas	(1)	(1)	(1)	(1)
California	3,707,120	$3,593,847	3,175,680	3,612,385
Colorado	52,110	29,670	93,370	49,162
Connecticut	(1)	(1)		
Florida	231,370	338,873	212,560	233,941
Idaho	(1)	(1)	5,000	7,500
Maine	(1)	(1)	26,000	55,800
Massachusetts	338,450	655,069	235,150	346,404
Missouri	(1)	(1)	27,520	57,165
Montana	(1)	(1)	16,650	10,797
Nevada	35,370	38,199	40,110	56,283
New Hampshire	(1)	(1)		
New Jersey	(1)	(1)	(1)	(1)
New York	(1)	(1)	(1)	(1)
North Carolina	216,520	376,055	(1)	(1)
Ohio	(1)	(1)		
Oregon	38,840	55,279	(1)	(1)
Pennsylvania	122,710	308,713	133,470	323,323
Rhode Island	58,95	140,468	197,660	346,463
South Dakota	2,510	3,888	3,410	3,885
Utah	(1)	(1)	57,560	29,206
Virginia			76,880	119,383
Washington			11,700	11,700
Wisconsin	(1)	(1)		
Undistributed	438,190	564,841	413,910	439,393
	5,242,140	6,104,902	4,758,630	5,744,957

[1] Included under "Undistributed."

Miscellaneous varieties of stone sold or used by producers in the United States in 1926, by States and uses

State	Number of active plants	Building		Riprap and rubble		Crushed stone				Other uses		Total	
		Short tons	Value	Short tons	Value	Concrete and road metal		Railroad ballast		Short tons	Value	Short tons (approximate)	Value
						Short tons	Value	Short tons	Value				
Arizona	1					32,000	$42,167					32,000	$42,167
Arkansas	2					(1)	(1)	(1)	(1)			(1)	(1)
California	66	(1)	(1)	241,120	$629,240	2,724,870	2,778,843	201,670	$177,190	(1)	(1)	3,175,680	3,612,385
Colorado	2					93,370	49,162					93,370	49,162
Florida	8					212,560	233,941					212,560	233,941
Idaho	1					5,000	7,500					5,000	7,500
Maine	3					26,000	55,800					26,000	55,800
Massachusetts	7	2,430	$3,691			209,720	302,463	23,000	40,250			235,150	346,404
Missouri	1					27,520	57,165					27,520	57,165
Montana	3					16,650	10,797					16,650	10,797
Nevada	4					39,890	55,219			220	$1,064	40,110	56,283
New Jersey	1	(1)	(1)			(1)	(1)					(1)	(1)
New York	1					(1)	(1)					(1)	(1)
North Carolina	1	(1)	(1)			(1)	(1)					(1)	(1)
Oregon	1					(1)	(1)					(1)	(1)
Pennsylvania	16	(1)	(1)	(1)	(1)	89,370	155,045	(1)	(1)	39,190	160,047	133,470	323,323
Rhode Island	7	(1)	(1)			196,060	342,263			(1)	(1)	197,660	346,463
South Dakota	3					3,410	3,885					3,410	3,885
Utah	3			(1)	(1)	56,850	28,423			(1)	(1)	57,560	29,206
Virginia	4					76,880	119,383					76,880	119,383
Washington	1			3,900	3,900			7,800	7,800			11,700	11,700
Undistributed		14,140	38,797			247,980	321,523	159,550	105,160	7,480	14,239	413,910	439,393
	136	16,570	42,488	245,020	633,140	4,058,130	4,563,579	392,020	330,400	46,890	175,350	4,758,630	5,744,957

[1] Included under "Undistributed."

CRUSHED STONE (CONCRETE AND ROAD METAL AND RAILROAD BALLAST)

The crushed stone sold or used by producers for concrete and road metal and for railroad ballast in the United States increased 9 per cent in both quantity and value in 1926 as compared with 1925. Stone for concrete and road metal increased 6 per cent in quantity and 7 per cent in value. Stone for railroad ballast increased 22 per cent in both quantity and value. For 1926, as for the three years preceding, a canvass was made of railroad companies in order to obtain more complete reports of the noncommercial material quarried and used by them. A similar canvass was made of the highway departments of all the States to ascertain the amount of noncommercial material used by them. Except those from a few States the reports are not entirely satisfactory; records are not kept by all States in such a way as to give this information. There are also great variations in the output reported by States and municipalities, because much of the State and municipal work depends on appropriations that vary greatly from year to year.

In 1926 a special inquiry was made to ascertain the extent of shipment of crushed stone according to methods of transportation. Although the replies received were not entirely satisfactory, they indicated that about 57 per cent was shipped on railroads, 27 per cent by motor trucks, 15 per cent by boat or barge, and 1 per cent by teams, trams, and other means. Railroad hauls ranged from 20 to 300 miles, 80 miles being about an average. Boat hauls were 20 to 350 miles. Motor truck shipments were 1 to 25 miles, averaging 10 to 12 miles.

Crushed stone sold or used by producers in the United States, 1925 and 1926

Kind	Concrete and road metal		Railroad ballast		Total		
	Short tons	Value	Short tons	Value	Short tons	Value	
						Total	Average
1925							
Granite	4,659,780	$5,685,878	1,165,770	$825,022	5,825,550	$6,510,900	$1.12
Basalt and related rocks (trap rock)	9,775,460	11,940,463	1,643,760	1,754,786	11,419,220	13,695,249	1.20
Limestone	41,800,470	44,966,391	9,537,370	7,479,719	51,337,840	52,446,110	1.02
Sandstone	1,835,910	2,414,042	415,000	358,781	2,250,910	2,772,823	1.23
Miscellaneous	4,752,180	4,979,955	87,230	103,392	4,839,410	5,083,347	1.05
	62,823,800	69,986,729	12,849,130	10,521,700	75,672,930	80,508,429	
Average value per ton		1.11		0.82		1.06	
1926							
Granite	5,200,480	6,593,135	1,268,620	866,004	6,469,100	7,459,139	1.15
Basalt and related rocks (trap rock)	10,271,700	12,423,852	2,222,560	2,358,006	12,494,260	14,781,858	1.18
Limestone	45,237,350	48,650,616	11,029,690	8,785,563	56,267,040	57,436,179	1.02
Sandstone	2,124,870	2,818,748	710,140	482,111	2,835,010	3,300,859	1.16
Miscellaneous	4,058,130	4,563,579	392,020	330,400	4,450,150	4,893,979	1.10
	66,892,530	75,049,930	15,623,030	12,822,084	82,515,560	87,872,014	
Average value per ton		1.12		0.82		1.06	

ABRASIVE MATERIALS [1]

INTRODUCTION

The production of natural abrasive materials is a varied industry in which a considerable number of widely scattered dissimilar enterprises are engaged in placing different commodities on the markets. By present-day standards in mining and manufacturing few, if any, of these enterprises would be considered large. Nevertheless, individually as well as collectively, they are important elements in the industrial life of the country, inasmuch as they supply tools for grinding, polishing, and other abrasive operations and the ingredients of cleansing compounds, without which the great wood, leather, and metal working and other industries and many householders would be put to great expense and inconvenience in the use of substitutes.

This chapter considers mineral products which as such or as essential constituents of manufactured products are used as abrasive materials. Some of these mineral products are used in other ways also—for example, tripoli as a filler and diatomite for thermal insulation. With these minerals segregation of production according to uses is difficult, but the total production for all uses is shown in this report. Feldspar and quartz, both of which are used as abrasives, are excluded from this report because that is not their principal use and because precise separation of the statistics according to uses is impossible. Therefore they are considered in other chapters of Mineral Resources, entitled "Feldspar" and "Silica."

Statistics on artificial abrasives are included for comparison and because of their strong influence on the marketing of natural abrasives.

It is a pleasure to record the appearance of and to refer students of the abrasive industry to a series of excellent bulletins written by V. L. Eardley-Wilmot and recently published by the Canada department of mines.[2] These bulletins, which discuss primarily Canadian resources, sources of supply, mining and preparation, and uses, furnish also a wealth of similar information not elsewhere brought together, relating to the United States and to other countries.

NATURAL ABRASIVES

Under the head of natural abrasives in this report are included millstones and related quarry products, such as chasers, dragstones, and paving stone for chaser mills; grindstones and pulpstones; oil-

[1] Figures on production compiled by Miss A. T. Coons and Miss B. H. Stoddard, of the Bureau of Mines. Data on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

[2] Eardley-Wilmot, V. L., Abrasive Products of Canada, Technology and Application: Part I, "Siliceous abrasives"; Part II, "Corundum and diamond"; Part III, "Garnet"; Part IV, "Artificial abrasives" (in preparation); Canada Dept. Mines, Mines Branch, Bull. 673, 675, and 677, Ottawa, 1927.

stones, whetstones, hones, scythestones, and rubbing stones; corundum and emery; abrasive garnet; tripoli; diatomite (diatomaceous earth); pumice; and pebbles and lining for tube mills. These natural abrasives were produced in 1926 in 26 States, as follows:

Arizona	Pumice.
Arkansas	Oilstones.
California	Diatomite, grinding pebbles, and pumice.
Illinois	Tripoli.
Indiana	Rubbing stones, scythestones, and whetstones.
Kansas	Pumice.
Kentucky	Whetstones.
Maryland	Diatomite.
Michigan	Grindstones.
Minnesota	Grinding pebbles and tube-mill lining.
Missouri	Tripoli.
Nebraska	Pumice.
Nevada	Diatomite.
New Hampshire	Diatomite, garnet, millstones, and scythestones.
New York	Diatomite, emery, garnet, and millstones.
North Carolina	Millstones.
Ohio	Grindstones, pulpstones, rubbing stones, scythestones, and whetstones.
Oklahoma	Tripoli.
Oregon	Diatomite.
Pennsylvania	Rottenstone.
South Dakota	Grinding pebbles and tube-mill lining.
Tennessee	Tripoli.
Vermont	Scythestones.
Virginia	Millstones.
Washington	Diatomite, pulpstones, and rubbing stones.
West Virginia	Grindstones and pulpstones.

MILLSTONES

The value of the millstones or burrstones and related quarry products—chasers, dragstones, and pavers—sold by producers in the United States in 1926 was $45,937. This was more than two times the value in 1925. During the past six years Ulster County, N. Y., has been the principal source of output, and the largest number of producers reported from that region.

American millstones have been and are still for the most part made of quartz sandstone and conglomerate, chiefly in Ulster County, N. Y., and Montgomery County, Va., but also in Pennsylvania. Millstones are also made of granite, particularly in Alabama, Maine, Minnesota, New Hampshire, and North Carolina. The production recorded in Mineral Resources includes only the stones made for other than purely local use. Doubtless a large number of stones have been made in many unrecorded localities as local use has required, and they have been made of other rocks than those specified, particularly in the mountain sections of the Southern States. Formerly the millstone manufacturing industry was much larger than at present. About 1880 the total value of the stones produced and sold in the United States was around $200,000 annually. The production has declined since the late eighties and during the last six years has been less than $50,000 worth of stones annually. The decline is due in part to the fact that the manufacture of millstones is a handcraft in which, as in many others in the United States, the old master craftsmen, who are gradually disappearing, are not being replaced. In part, also, the change is due to new processes in the

grain, paint, and mineral milling industries in which the old-style burrstones and chaser mills are being supplanted by grinding equipment of an entirely different type.

Value of millstones, chasers, and dragstones sold by producers in the United States, 1917–1926

Year	New York		Other States [1]		Total	
	Producers	Value	Producers	Value	Producers	Value
1917	10	$22,103	8	$21,386	18	$43,489
1918	14	25,488	13	67,026	27	92,514
1919	7	10,155	11	56,817	18	66,972
1920	8	13,331	11	49,994	19	63,325
1921	12	14,672	7	9,852	19	24,524
1922	12	17,025	4	3,828	16	20,853
1923	17	14,344	4	7,885	21	22,229
1924	17	18,215	5	11,910	22	30,125
1925	13	14,063	5	8,427	18	22,490
1926	12	23,629	7	22,308	19	45,937

[1] 1917 and 1919: Alabama, North Carolina, Pennsylvania, and Virginia; 1918: Maryland, North Carolina, Pennsylvania, and Virginia; 1920: Alabama, Maryland, North Carolina, and Virginia; 1921: Alabama, New Hampshire, North Carolina, and Virginia; 1922: Alabama, North Carolina, and Virginia; 1923: Maine, Minnesota, North Carolina, and Virginia; 1924–1926: New Hampshire, North Carolina, and Virginia.

GRINDSTONES AND PULPSTONES

Grindstones and pulpstones are made from sandstone quarried in northeastern and eastern Ohio, western West Virginia, eastern Michigan and, during the last few years, in Pierce County, Wash. In 1926 there was an increase of 3 per cent in the total quantity of grindstones and pulpstones sold by producers as compared with 1925. The total value of such stones in 1926 was $1,873,234.

Grindstones and pulpstones sold by producers in the United States, 1917–1926

Year	Grindstones		Pulpstones		
	Short tons	Value	Pieces	Short tons	Value
1917	54,432	$806,896	2,325	[1]	$340,888
1918	56,554	1,262,602	2,921	8,785	513,680
1919	40,755	993,959	2,450	6,110	342,056
1920	44,832	1,239,900	2,321	8,652	467,014
1921	15,310	477,259	2,941	10,030	750,063
1922	21,367	574,900	[2] 1,619	[2] 5,157	[2] 445,286
1923	37,384	1,008,899	2,533	9,186	680,416
1924	28,991	852,260	2,660	9,193	814,409
1925	28,970	864,637	2,530	8,370	841,302
1926	28,669	875,240	2,804	9,670	997,994

[1] Figures not available. [2] Exclusive of sales in Washington prior to 1923.

OILSTONES AND SCYTHESTONES

Natural stone or quarry products used as abrasive material include, besides the millstones, grindstones, and pulpstones above considered, oilstones, whetstones, hones, rubbing stones, and scythestones. These are cut or otherwise shaped, usually in small pieces, in a great variety of forms for the special uses indicated by their names. Oilstones are produced in the United States chiefly from novaculite

quarried in Arkansas; whetstones chiefly from sandstone quarried in Indiana, Kentucky, and Ohio; scythestones from sandstone quarried in Indiana and Ohio and from schist quarried in New Hampshire and Vermont; and rubbing stones from sandstone quarried in Indiana, Ohio, and Washington. In earlier years a small production of hones was from sandstone quarried in Kentucky, but none was reported in 1924, 1925, and 1926.

Oilstones, whetstones, hones, scythestones, and rubbing stones sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	1,816	$168,704	1922	1,016	$197,450
1918	1,010	189,033	1923	1,223	231,812
1919	1,463	235,943	1924	1,056	258,943
1920	1,144	231,747	1925	970	272,224
1921	831	173,025	1926	1,680	223,359

CORUNDUM AND EMERY

No production of corundum in the United States has been reported since 1918, and emery was produced for sale in 1926 only from the Peekskill region, New York. The deposits in Pittsylvania County, Va., were worked, but the ore mined was not disposed of in 1926. Deposits in other localities have either been exhausted or, under present conditions, can not meet the competition of emery from New York, Greece, and Turkey.

Emery sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	[1] 17,135	[1] $241,050	1922	1,468	$17,511
1918	[2] 10,422	[2] 112,878	1923	2,286	29,478
1919	2,601	23,203	1924	2,195	19,756
1920	2,327	21,685	1925	769	5,907
1921	305	2,250	1926	386	3,641

[1] Includes 820 short tons of corundum, valued at $67,461. [2] Includes corundum.

GARNET

In 1926 the sales of abrasive garnet by producers in the United States amounted to 6,397 short tons, valued at $523,875. This is the smallest output reported in any year since 1921. The average value of garnet mined in 1926 was close to $82 a ton, as compared with $85 in 1925, $81 in 1924, and $76 in 1923. The major part of the production was made in Warren County, N. Y., and the remainder in Merrimack County, N. H. Some New York garnet was sold at prices well above the average value cited.

Abrasive garnet sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	4,995	$198,327	1922	7,054	$566,879
1918	4,696	248,161	1923	9,006	688,437
1919	4,944	310,131	1924	8,290	674,176
1920	5,476	434,425	1925	8,429	712,853
1921	3,048	260,687	1926	6,397	523,875

TRIPOLI

The value of tripoli sold (including Pennsylvania "rottenstone") in 1926, as reported by producers, was $523,609. This value corresponds approximately to 31,000 short tons of material, of which about one-seventh was sold in the form of crude quarry products and some of which was sold for little more than $1 a ton. Most of the production, however, was sold in ground or otherwise prepared form by the producers at values ranging from $16 to $21 a ton.

The chief sources of production in 1926, as in previous years, were a small area lying in Newton County, Mo., and Ottawa County, Okla., and the Alexander-Union County area in southern Illinois. An appreciable output was also reported from Tennessee, and the output of rottenstone in Lycoming County, Pa., is also included in the figures here presented.

Some of the Missouri-Oklahoma tripoli is produced primarily for use as an abrasive, and some of it is mined to be worked up into filter blocks, the cuttings and waste from the making of which are ground and prepared for abrasive and other uses. The larger part of the Missouri output is used as filler, for foundry facings, and in many other ways. The Illinois product is generally known simply as "silica," and though used to some extent as an abrasive for metal polishes, in soaps, and in cleansers, it is very largely used in paint and fillers, in making glass, in the body and enamel of ceramic wares, and for facing foundry molds.

It is not possible to determine the amounts of tripoli used as abrasive material and otherwise, nor to obtain from the producers uniform reports on the quantity and value of the crude or rough quarried material, as they sell much of the product originally in some manufactured or prepared form. Statistics herein reported and in earlier chapters of Mineral Resources therefore do not permit satisfactory comparison between years or between producing States. In the following table the value for the total output of crude tripoli is in part an arbitrarily assigned value, inasmuch as a large part of the output is not sold crude but in ground or other prepared form by the original producers. The values given "as sold" are the total realizations as reported by producers and include receipts from sales of both crude and ground or otherwise finished material.

Tripoli (including Pennsylvania rottenstone) sold or used by producers in the United States, 1917–1926

Year	Illinois			Other States [1]			Total		
	Short tons	Value		Short tons	Value		Short tons	Value	
		Crude (estimated)	As sold (crude and finished)		Crude (estimated)	As sold (crude and finished)		Crude (estimated)	As sold (crude and finished)
1917	16,133	$31,338	$207,738	9,936	$61,078	$130,450	26,069	$92,416	$338,188
1918	12,004	18,902	100,126	7,978	34,913	99,728	19,982	53,815	199,854
1919	13,014	32,961	116,492	11,278	65,049	65,049	24,292	98,010	181,541
1920	24,458	66,509	360,651	15,775	97,567	209,026	40,233	164,076	569,677
1921	7,765	27,333	125,352	4,575	26,559	87,661	12,340	53,892	213,013
1922	18,747	54,741	194,371	11,458	50,568	122,357	30,205	105,309	316,728
1923	11,522	31,230	117,201	15,560	30,960	265,556	27,082	62,190	382,757
1924	13,466	23,566	116,188	15,010	31,971	273,221	28,476	55,537	389,409
1925	11,809	27,480	143,859	17,579	31,290	291,027	29,388	58,770	434,886
1926	11,948	29,870	192,483	19,421	35,152	331,126	31,369	65,022	523,609

[1] 1917–1923: Missouri, Oklahoma, and Pennsylvania; 1924–1926: Missouri, Oklahoma, Pennsylvania, and Tennessee.

DIATOMITE

The output of diatomite (diatomaceous earth) in 1926, as reported to the Bureau of Mines totaled 87,126 short tons, valued at $1,081,564. This is the largest production on record and reflects the growth of consumption and the increasing variety of uses to which this material is applied. Probably the development of chief importance in respect to diatomite during recent years was the increased appreciation of its value for use with cement in concrete aggregate.

As usual, the chief source of production was California, but a large output was also reported from Oregon. Smaller amounts were reported from Nevada, Maryland, New York, Washington, and New Hampshire.

Diatomite sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917 [1]	3,033	$31,368	1922	44,761	$386,669
1918 [1]	2,965	24,947	1923	65,833	699,406
1919	42,642	531,960	1924	63,163	693,917
1920	61,922	1,079,693	1925	75,030	922,281
1921	[2] 55,134	[2] 682,616	1926	[2] 87,126	[2] 1,081,564

[1] Exclusive of considerable production for special uses upon which the Bureau of Mines is not at liberty to report.
[2] Partly estimated.

PUMICE

Production of pumice in the United States in 1926 was reported from Yuma County, Ariz.; Imperial County, Calif.; Harper, Haskell, Meade, Norton, and Seward Counties, Kans.; and Lincoln County, Nebr. The California output was largely lump pumice. In Kansas and Nebraska the pumice was dug from beds of fragmental volcanic glass or so-called ash. The total quantity sold or used by producers in 1926 was 53,887 short tons, valued at $208,504, which was more than during any preceding year except 1923.

Pumice sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	35,293	$84,814	1922	45,262	$175,600
1918	30,637	91,178	1923	56,575	214,169
1919	36,051	116,835	1924	43,651	190,253
1920	41,838	114,433	1925	40,380	179,020
1921	37,108	158,540	1926	53,887	208,504

PEBBLES FOR GRINDING AND FLINT LINING FOR TUBE MILLS

The commercial production of pebbles used for grinding minerals, ores, cement, and for other purposes, together with the output of quartzite blocks for use as tube-mill liners, includes, so far as known to the Bureau of Mines, only the output of beach pebbles in southern California and of cut cubes and artificially rounded pebbles and cut liners made of quartzite in Minnesota and South Dakota. The figures in the following table appear to cover the entire commercial output, but doubtless there was unrecorded additional production for local or own use by other companies than those reporting.

Pebbles for grinding and flint lining for tube mills sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	15,050	$131,441	1922	3,159	$30,798
1918	12,469	129,485	1923	4,551	51,795
1919	9,448	85,302	1924	2,532	37,429
1920	10,924	77,823	1925	3,831	50,147
1921	989	14,637	1926	6,219	85,146

IMPORTS AND EXPORTS

Value of abrasive materials imported for consumption in the United States, 1922–1926

Material	1922	1923	1924	1925	1926
Millstones and burrstones	$15,356	$20,102	$6,311	$8,413	$6,266
Grindstones	81,733	106,028	122,440	124,319	120,335
Hones, oilstones, and whetstones	48,938	53,233	43,579	49,108	63,152
Emery and corundum	389,390	722,688	364,755	313,718	616,700
Garnet	[1] 1,837	93,803	54,402	200	----------
Diatomaceous earth, tripoli, and rottenstone	10,429	11,779	9,504	6,589	14,544
Pumice	118,458	128,693	111,284	130,460	129,449
Diamond dust and bort	1,029,261	228,409	259,482	760,476	271,382
Flint, flints, and flintstones, unground	145,805	130,974	114,958	105,041	120,078

[1] Not separately classified prior to tariff of Sept. 22, 1922.

Abrasive materials imported for consumption in the United States, 1925–26, by kinds

Kind	1925		1926	
	Quantity	Value	Quantity	Value
Millstones and burrstones				
Rough or unmanufactured, short tons	139	$7,944	102	$5,035
Bound up into millstones, do	2	469	50	1,231
Grindstones, finished or unfinished, do	2,625	124,319	2,253	120,335
Hones, oilstones, and whetstones, do	229	49,108	544	63,152
Emery:				
Ore, do	7,610	127,751	4,745	182,977
Grains, ground, pulverized, or refined, pounds	214,446	9,045	(1)	(1)
Paper and cloth of emery or corundum, do	269,836	61,315	562,419	86,698
Wheels, files, and other manufactures of which emery or corundum is the material of chief value, pounds	65,896	33,316	57,271	31,899
Corundum (see also "Emery"):				
Ore, short tons	1,643	81,273	5,411	302,180
Grains, ground, pulverized, or refined, pounds	10,980	1,018	[1] 305,779	[1] 12,946
Garnet, short tons	2	200	----------	----------
Diatomaceous earth, tripoli, and rottenstone, do	160	6,589	1,033	14,544
Pumice:				
Crude or unmanufactured, do	10,142	98,592	9,589	90,886
Manufactures of, or of which pumice is the component material of chief value, short tons	2,990	31,868	(2)	38,563
Diamond:				
Bort, carats	104,247	731,060	17,690	207,966
Dust, pounds	128	29,416	(2)	63,416
Flint, flints, and flintstones, unground, short tons	16,240	105,041	15,091	120,078
	----------	1,498,324	----------	1,341,906

[1] Emery included with corundum; not separately classified.
[2] Quantity not recorded.

Value of domestic abrasive materials exported from the United States, 1922–1926

Material	1922	1923	1924	1925	1926
Grindstones	$281,413	$499,123	$481,397	$553,750	$629,748
Abrasive wheels, emery, and other	644,151	571,733	521,840	439,904	248,631
All other natural abrasives, hones, whetstones, etc	292,051	342,737	173,731	195,915	323,447

WORLD'S PRODUCTION

World's production of natural abrasives, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

	1922	1923	1924	1925	1926
Corundum:					
Madagascar (exports)	186	421	147	206	121
Rhodesia, Southern			38	44	39
Russia	2	(1)	(1)	(1)	(1)
Union of South Africa	1,836	2,554	1,695	1,662	5,439
Diatomite:					
Algeria	2,480	10,000	[2] 9,092	[2] 8,343	[2] 7,931
Australia—New South Wales	489	523	573	712	926
Canada	199	118	30		
France	4,620	4,550	2,300	1,500	(1)
Germany (exports)	5,207	4,096	4,326	4,555	5,919
Ireland (northern)	1,909	1,680	2,480	(1)	(1)
Italy	175	420	420	420	1,200
Japan	4,690	5,319	5,040	4,727	(1)
Norway (exports)	82	110	67	48	(1)
Sweden	322	696	608	819	(1)
Union of South Africa	(3)	217	236		
United States	40,606	59,722	57,300	66,251	79,039
Emery:					
Australia—New South Wales					52
Germany (Bavaria)	420	400	350	370	375
Greece	13,000	21,626	23,000	20,354	27,394
Turkey	(1)	(1)	(1)	6,532	3,802
United States	1,332	2,074	1,991	698	350
Garnet:					
Canada		1,134	327		
Japan	3,405	3,586	3,530	3,540	(1)
Madagascar	(4)	(4)	(4)	(4)	(4)
Spain	(1)	982	1,112	182	(1)
United States	6,399	8,170	7,521	7,647	5,803
Grinding pebbles and tube-mill lining:					
Australia—South Australia	753	478	396	103	118
Canada	(1)	(1)	(1)	95	58
France	(5)	(5)	(5)	(5)	(5)
Greenland	15,726	20,914	25,570	18,352	13,008
Russia	23	[6] 343	(1)	(1)	(1)
United States	2,866	4,129	2,297	3,475	5,642
Grindstones and pulpstones:					
Canada	896	1,795	2,408	2,282	2,421
Italy (grindstones)	875	960	860	1,040	1,020
Sweden	(7)	(7)	(7)	(7)	(1)
Turkey	(1)	(1)	(1)	[8] 13,313	[8] 18,426
United States	24,062	42,247	34,640	33,874	34,780
Millstones:					
France	19,105	16,690	26,827	24,348	(1)
Greece	[8] 8,811	[8] 2,400	[8] 2,790	[8] 3,850	(1)
Italy	1,885	2,220	2,300	2,470	2,815
Sweden	123	170	120	102	(1)
United States	(9)	(9)	(9)	(9)	(9)
Yugoslavia	(1)	[8] 46	(1)	[8] 2,163	[8] 1,395
Oilstones, scythestones, etc.:					
Belgium (whetstones)	[8] 68,930	[8] 207,950	[8] 140,970	[8] 145,250	(1)
Canada	16	32	33	42	24
France (whetstones)	778	1,486	4,808	772	(1)
Germany (Bavaria) (whetstones)	43	42	14	12	55
Italy (honestones)	372	452	517	782	930
United States	922	1,109	958	880	1,524
Pumice:					
Canada (volcanic ash)			222	145	82
Italy	21,036	30,473	31,094	47,900	45,308
Japan—					
Pumice sand	61,979	48,114	48,399	50,825	(1)
Volcanic ash	112,973	142,070	36,127	27,885	(1)
New Zealand	3,068	[2] 3,776	[2] 1,655	[2] 2,573	[2] 2,396
United States	41,061	51,324	39,599	36,632	48,885
Tripoli:					
France		65	50	(1)	(1)
Spain	524	869	404	868	804
United States	27,401	24,568	25,833	26,660	28,457

[1] Data not available.
Exports.
[3] Quantity not reported; value $9,277.
[4] Abrasive garnet is produced in and exported from Madagascar, but figures as reported include citrine and other precious stones.
[5] France is a large producer and exporter of flint pebbles for grinding; neither output nor exports are available.
[6] Year ended Sept. 30.
[7] Quantity not reported, value given as follows: 1922, $5,473; 1923, $7,405; 1924, $7,956; 1925, $9,935.
[8] Number of stones; weight not reported.
[9] Quantity not reported, value given as follows: 1922, $20,853; 1923, $22,229; 1924, $30,125; 1925, $22,490; 1926, $45,937.

ARTIFICIAL ABRASIVES

The table that follows gives the production of silicon carbide, aluminum oxide, and steel shot or crushed steel grains. These materials compete with the natural abrasives used as grains—for example, emery, corundum, and garnet. The figures represent the total output of crude materials or first product of the manufacturing plants, not all of which is used as abrasive material; in fact, a large but undetermined part of the silicon carbide and aluminum oxide output is not so used. The total output is shown here without separation of the products according to the uses to which they are put, because it is thought that the proportion used as abrasive material has not fluctuated so widely in recent years as to destroy the value of these figures for comparison with the statistics of natural abrasives.

Crude artificial abrasives, sold, shipped, or used, from manufacturing plants in the United States and Canada, 1917–1926

Year	Silicon carbide		Aluminum oxide		Metallic abrasives		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	8,323	$1,074,152	48,463	$6,969,387	1,125	$93,703	57,911	$8,137,242
1918	10,047	1,518,600	35,716	5,741,270	5,150	422,727	50,913	7,682,597
1919	28,435	3,380,151	19,723	3,811,498	2,360	274,200	50,518	7,465,849
1920	6,887	1,309,605	32,891	5,956,639	2,659	225,920	42,437	7,492,164
1921	2,707	475,336	7,325	1,318,771	3,167	202,040	13,199	1,996,147
1922	16,233	2,022,613	31,898	3,246,714	5,804	421,148	53,935	5,690,475
1923	21,149	2,786,929	51,391	5,378,926	8,229	612,140	80,769	8,777,995
1924	17,792	2,161,498	33,708	3,482,577	8,597	569,665	60,097	6,213,740
1925	24,112	2,493,756	53,253	4,714,562	11,165	780,612	88,530	7,988,930
1926	17,026	1,702,037	43,967	4,106,699	12,610	942,429	73,603	6,751,165

MICA

By B. H. Stoddard

INTRODUCTION

The mica industry in 1926 showed continued improvement, as evidenced by the increased sales of domestic uncut sheet mica reported by producers and others in the business, and by substantial increase in the imports of mica into the United States chiefly from India. The United States is the largest producer and consumer of mica in the world, and in 1926 produced 8,129 short tons of uncut mica, valued at $536,827. No definite figures are available as to the consumption of sheet mica in this country, but for 1926 it may be approximately calculated at 3,000 short tons, valued at $2,600,000. The United States produces both sheet and scrap mica, the larger proportion being scrap mica, of which the production is many times greater than that of sheet mica. On the other hand, the imports o mica into this country consist almost entirely of sheet mica and splittings, the larger proportion being splittings. It will therefore be seen that although the United States is the largest producer of mica in the world, it does not produce enough sheet mica to supply its requirements, so that there is always a demand in this country for sheet mica of good quality properly prepared.

The name "mica" is applied to a group of minerals having related chemical structure and similar physical properties. The most characteristic property is a capacity to split easily into very thin, flexible, and generally transparent sheets, in which form it finds its greatest economic usefulness. This, in addition to its toughness, high dielectric strength, and other qualities possessed by some varieties, renders it commercially valuable.

Of the many varieties of mica only two yield the "sheet mica" of commerce. These are muscovite, also known as white mica, and phlogopite, or magnesium mica, also known as amber mica. These are the chief varieties of commerce, but small quantities of biotite, a black or dark brown iron-magnesia mica, have been used. Muscovite is the variety that is now mined on a large scale in the United States; no phlogopite deposits of commercial value in the United States have been worked for many years. Muscovite may be white, gray, yellow (inclining to amber), brown, red, or green. Brown and red muscovite of the proper shades are often called "rum" and "ruby" mica. It is, however, generally light colored, ranging from colorless in thin sheets to amber yellow, green, or brownish red in sheets over one-sixteenth of an inch thick. Phlogopite may be silvery gray, yellow, brown, or black, and some varieties appear coppery.

Lepidolite, or lithia mica, is used principally as a source of lithia or as an ornamental stone, and roscoelite, or vanadium mica, as a source of vanadium. Paragonite, or soda mica, zinnwaldite, or iron-lithia mica, and other varieties are of scientific interest only.

PRODUCTION

Most of the domestic mica when first sold is roughly trimmed by the fingers, hence the term thumb-trimmed, or it is poorly knife-trimmed. Mica in this form is referred to as "uncut" sheet mica; that is, mica not cut according to specification into special sizes or shapes. The statistics of sheet mica in this report represent mica in this uncut form, or approximately this form.

The total quantity of uncut mica sold by producers in the United States in 1926 was 8,129 short tons, valued at $536,827. Of this quantity, 2,172,159 pounds (1,086 tons), valued at $400,184, was sheet mica; the rest was scrap mica. These figures indicate an increase in sheet mica of 21 per cent in quantity and of 24 per cent in value, as compared with 1925. The total scrap mica sold showed a decrease of 27 per cent in quantity and of 21 per cent in value. The chief producing States in 1926 were New Hampshire and North Carolina, which showed increases. Sales of uncut sheet mica in New Hampshire increased 22 per cent in quantity and 19 per cent in value; and the sales of uncut sheet mica in North Carolina increased 18 per cent in quantity and 43 per cent in value.

The average value at points of production of all sheet mica sold by producers in the United States in 1926 was about 18 cents a pound, virtually the same as in 1925, and the average value of scrap mica was about $19 a short ton in 1926, as compared with $18 in 1925.

The production of mica in 1926 was made by nine States—North Carolina, New Hampshire, New Mexico, South Dakota, Virginia, Georgia, Colorado, South Carolina, and Connecticut, named in order of quantity from greatest to least.

The following table shows the quantity and value of uncut sheet and scrap mica sold by producers in the United States from 1917 to 1926:

Mica sold by producers in the United States, 1917–1926 [1]

Year	Sheet mica [1]		Scrap mica		Total [1]	
	Pounds	Value	Short tons	Value	Short tons	Value
1917	1,276,533	$753,874	3,429	$52,908	4,067	$806,782
1918	1,644,200	731,810	2,292	33,130	3,114	764,940
1919	1,545,709	483,567	3,258	58,084	4,031	541,651
1920	1,683,480	546,972	5,723	167,017	6,565	713,989
1921	741,845	118,513	2,577	56,849	2,948	175,362
1922	1,077,968	194,301	[2] 6,641	114,045	[2] 7,180	308,346
1923	2,063,179	311,180	[2] 8,054	129,695	[2] 9,086	440,875
1924	1,460,897	212,035	4,709	87,242	5,439	299,277
1925	1,793,865	321,962	9,695	173,537	10,592	495,499
1926	2,172,159	400,184	7,043	136,643	8,129	536,827

[1] For 1920 and later years the figures for sheet mica represent uncut sheet exclusively; for earlier years some cut sheet was included.
[2] Includes mica derived from mica schist.

Mica sold by producers in chief producing States, 1922–1926

State and year	Sheet mica			Scrap mica		Total	
	Pounds	Short tons	Value	Short tons	Value	Short tons	Value
New Hampshire:							
1922	475, 647	238	$63, 240	238	$5, 838	476	$69, 078
1923	835, 751	418	107, 674	1, 078	25, 871	1, 496	133, 545
1924	744, 133	372	88, 737	492	9, 498	864	98, 235
1925	1, 120, 857	560	198, 858	1, 953	47, 525	2, 513	246, 383
1926	1, 371, 890	686	235, 890	1, 738	38, 213	2, 424	274, 103
North Carolina:							
1922	544, 495	272	119, 767	[1] 4, 205	65, 923	[1] 4, 477	185, 690
1923	1, 130, 283	565	188, 317	[1] 5, 005	65, 764	[1] 5, 570	254, 081
1924	597, 385	299	108, 656	3, 212	59, 620	3, 511	168, 276
1925	592, 478	296	105, 376	5, 095	74, 818	5, 391	180, 194
1926	700, 313	350	150, 362	2, 880	54, 048	3, 230	204, 410

[1] Includes mica derived from mica schist.

REVIEW BY STATES

Colorado.—Sales of mica in Colorado were made by E. W. Lehman, Jamestown, who operated the High Line mine, near Jamestown, Boulder County, and by Henry Ramstetter, who operated the Ramstetter quarry near Golden, Jefferson County. The output of this State was all scrap mica.

Connecticut.—The Eureka Flint & Spar Co., Trenton, N. J., operated by lease the Strickland mine, 2½ miles northeast of Portland, Middlesex County, and sold the product as mine run.

Georgia.—The only output reported to the Bureau of Mines from Georgia in 1926 was from the Wacaster Mica Co., Hollysprings, which was obtained from the "Billie" mine near Hollysprings, Cherokee County.

New Hampshire.—In 1926 New Hampshire sold 63 per cent of the total quantity of domestic sheet mica sold by producers in the United States, as compared with 62 per cent in 1925. The average value in 1926 was 17 cents a pound. The average value of scrap mica per short ton in 1926 was $22, as compared with $24 in 1925.

The General Electric Co., Schenectady, N. Y., operated the Alexandria mine at Alexandria, Grafton County, N. H., the product of which was consumed by the company. The Golding-Keene Co., Keene, operated the Golding-Keene mine, and the output was sold in the mine run form. The mine is located at Alstead, Cheshire County. John T. Hanley, Cheever, operated the Streeter mine at Dorchester, Grafton County, the production of which was sold to eastern consumers. The Tatelman mine at Gilsum, Cheshire County, was operated by H. N. Kirk & Co., Keene, who purchased the property in May, 1926, from Louis Tatelman, of Keene. The New England Minerals Co., 85 Devonshire Street, Boston, Mass., reported operations of the Ruby mine at Grafton and the Standard (or Belden) mine at Orange, in Grafton County, and the Alstead mine at East Alstead, in Cheshire County. The production was consumed principally in the manufacture by the company of ground mica. The New Hampshire Mica & Mining Co., Keene, produced mica from the French mine at Alstead, Cheshire County. The sheet obtained was sold to consumers, and the scrap was ground by the company. O. B. Sargent, Canaan, operated the Joe Hill mine, at Springfield, Sullivan County, the production of which was sold as mine run. The Standard Feldspar Co., Rumney Depot, conducted operations at the Baldwin, Plume, Rogers, Ruggles, and Valencia mines in Grafton County.

New Mexico.—The total sales of sheet mica by producers in New Mexico in 1926 were 46,104 pounds, valued at $5,824, and sales of scrap mica were 988 short tons, valued at $16,683. Corresponding figures for 1925 were 34,486 pounds of sheet mica, valued at $7,531, and 920 tons of scrap mica, valued at $14,580.

H. K. Thurber, Ojo Caliente, obtained lease in April, 1926, to the Medca, Blanche, and Emma claims, near Ojo Caliente, Taos County, and made an initial shipment of scrap mica. The Hoyt Mineral Corporation, Las Tablas, operated the Las Tablas mines, near Las Tablas, Rio Arriba County, but made no shipments. Ganino Alire, Petaca, reported sales of sheet and scrap mica from his property in the Petaca mining district, Rio Arriba County. George M. Neel, Santa Fe, whose property is near La Madera, Rio Arriba County, reported annual assessment work only. Information was received from the New Mexico Mica Co., E. P. Davies, attorney and secretary, to the effect that the company expected shortly to produce sheet and scrap mica. W. R. Sudduth, Tres Piedras, operated the Augusta mine, near Petaca, Rio Arriba County. The output was chiefly punch mica, but several tons of scrap was also produced. The entire output was sold. Other operations in the State were those of R. Hugh Porter, who conducted operations at the L. & M. mine near La Madera, Rio Arriba County, for the American Mica Products Co., Chicago, Ill.

North Carolina.—The sales of sheet mica by producers in North Carolina in 1926 were 32 per cent of the total sheet mica sold by producers in the United States, as compared with 33 per cent in 1925. They increased 18 per cent in quantity and 43 per cent in value, as compared with 1925. Sales of scrap mica decreased 43 per cent in quantity from 1925 and were 41 per cent of the total scrap mica sold by producers. Average values in 1926 were 21 cents a pound for sheet mica and $19 a ton for scrap mica.

The list that follows contains the names of all producers of mica in North Carolina who reported sales for 1926, and the names and locations of the mines operated by them, but it is possible that there were other producers whose reports the Bureau of Mines did not receive. However, the statistics are essentially complete for this State, as the reports from producers have been supplemented by reports from buyers and others engaged in the industry.

Producers of mica in North Carolina making sales in 1926

Name and address	Name of mine	Location of mine	
		Nearest town	County
J. L. Bailey, Spruce Pine	Luke Lewis	Spruce Pine	Mitchell.
J. A. Bartlett, Spruce Pine	Hawkins	do	Do.
J. C. Burgin, Celo	Gibbs	Newdale	Yancey.
J. E. Burleson, Spruce Pine	Big Ridge	Waynesville	Haywood.
Carolina Mineral Co., Spruce Pine	Hoot Owl	Estatoe	Mitchell.
Carpenter, Daniels & Co., Hughes	Mud Hole		Avery.
Erwin Feldspar Co., Spruce Pine	Crabtree	Crabtree	Haywood.
Flat Rock Mica Co., Penland	Flat Rock and others	Penland	Mitchell.
General Mica & Clay Co., Franklin	Iotla Bridge	Franklin	Macon.
T. M. Green, Clarrissa	Lick Ridge		Mitchell.
W. E. Greene, Spruce Pine	Johnson	Hickory	Catawba.
J. C. Pitman & Co., Penland	Davis	Penland	Mitchell.
Jack Renfro, Greenmountain	Jones	Celo	Yancey.
Rickman, Wright, Reuss & Sisk, Franklin	Boyd Knob	Franklin	Macon.
Spruce Pine Mica Co., Spruce Pine	No. 10	Spruce Pine	Mitchell.
Tennessee Mineral Products Co., Spruce Pine		do	Do.
D. T. Vance, Plumtree	Alfred	Plumtree	Avery.
W. W. Wiseman, Ingalls	Wiseman	Spruce Pine	Mitchell.

South Carolina.—Output of mica in South Carolina was reported by dealers who purchased from small operators.

South Dakota.—In 1926 the sales of scrap mica, as reported by producers in South Dakota, were 835 short tons, valued at $15,907, compared with 996 tons in 1925, valued at $19,220. Small quantities of sheet mica were also reported as having been sold in 1926, but the figures may not be shown without disclosing confidential information. In 1925 sales of sheet mica were 1,555 pounds, valued at $207.

The Keystone Feldspar & Chemical Co., Keystone, operated the Peerless and Hugo mines near Keystone; its output of scrap mica was sold to consumers in Chicago. The mines are leased from the Reinbold Metallurgical Co., Omaha, Nebr. A. T. Roos, of the Dakota Feldspar Co., Rapid City, mined and sold sheet and scrap mica, which was obtained from the Beryl mica mine; the output was sold to consumers in Illinois and Indiana. W. D. Wood, Custer, operated the Custer mine 5 miles north of Custer and sold its output of scrap mica also to consumers in Illinois and Indiana.

Virginia.—E. G. Adams, Martinsville, operated the Griggs mine, near Martinsville, Henry County. The output was both sheet and scrap mica.

Wyoming.—H. L. Kuykendall, Saratoga, has obtained a lease on a property in Carbon County, near Encampment, which he expects to operate for scrap mica.

PRODUCERS OF SCRAP MICA

Following is a list of producers of scrap mica in 1926:

E. G. Adams, Martinsville, Va.
Ganino Alire, Petaca, N. Mex.
American Mica Products Co., 1015 North Halsted Street, Chicago, Ill. (mine in New Mexico).
J. L. Bailey, Spruce Pine, N. C.
J. C. Burgin, Celo, N. C.
Carolina Mineral Co., Spruce Pine, N. C.
Carpenter, Daniels & Co., Hughes, N. C.
Erwin Feldspar Co., Spruce Pine, N. C.
Flat Rock Mica Co., Penland, N. C.
General Electric Co., Schenectady, N. Y. (mine in New Hampshire).
General Mica & Clay Co., Franklin, N. C.
Golding-Keene Co., Keene, N. H.
J. T. Hanley, Cheever, N. H.
Hoyt Mineral Corporation, Las Tablas, N. Mex.
Keystone Feldspar & Chemical Co., Keystone, S. Dak.
H. N. Kirk & Co., Keene, N. H.
E. W. Lehman, Jamestown, Colo.
New England Minerals Co., 85 Devonshire Street, Boston, Mass. (mine in New Hampshire).
New Hampshire Mica & Mining Co., Keene, N. H.
J. C. Pitman & Co., Penland, N. C.
Henry Ramstetter, R. R. 4, Golden, Colo.
Jack Renfro, Greenmountain, N. C.
A. T. Roos, Rapid City, S. Dak.
Spruce Pine Mica Co., Spruce Pine, N. C.
Standard Feldspar Co., Rumney Depot, N. H.
W. R. Sudduth, Tres Piedras, N. Mex.
Tennessee Mineral Products Co., Spruce Pine, N. C.
H. K. Thurber, Ojo Caliente, N. Mex.
D. T. Vance, Plumtree, N. C.
Wacaster Mica Co., Hollysprings, Ga.
W. W. Wiseman, Ingalls, N. C.
W. D. Wood, Custer, S. Dak.

PRICES

In 1926 the range of prices per pound for rough-trimmed uncut sheet mica, as reported to the Bureau of Mines by producers and others engaged in the industry, were as follows:

Range of prices per pound for rough-trimmed uncut sheet mica in 1926

Size	Clear	Stained	Size	Clear	Stained
Punch	$0.05 to $0.15	$0.03 to $0.15	3 by 4 inches	$1.40 to $1.95	$1.00 to $1.40
1½ by 2 inches	.15 to .50	.15 to .25	3 by 5 inches	1.50 to 3.00	1.25 to 1.70
2 by 2 inches	.40 to .75	.12 to .40	4 by 6 inches	2.00 to 3.90	1.60 to 2.25
2 by 3 inches	.75 to 2.00	.30 to .75	6 by 8 inches	4.00 to 5.50	2.00 to 3.00
3 by 3 inches	1.20 to 1.50	.65 to .90	8 by 10 inches	6.00 to 8.00	2.50 to 3.00

Prices of scrap mica a short ton ranged from $15 to $32 at the mines.

USES

Sheet mica.—Mica finds its most important application in the electrical industry, where a noninflammable, resistant insulating material is necessary. Its cleavage, transparency, toughness, softness, flexibility, and elasticity, combined with its resistance to electric puncture, its infusibility, and imperviousness to moisture, render it an ideal insulator. All sizes of sheet mica are in demand, from the smallest (punch) to 6 by 8 inches and larger. The principal uses of mica in electrical apparatus are for making condensers for magnetos for the engines of airplanes, automobiles, and trucks, for radio apparatus, in the manufacture of the telephone transmitter button, as an insulator between the copper segments of commutators in direct-current dynamos and motors, for several kinds of transformers, and for washers and rings around bolts and screens requiring insulation. Large disks and washers are used in arc lights and smaller ones in the sockets of incandescent lamps. Sheet mica is also used for making spark-plug cores, but the development of improved spark-plug porcelains has been the means of supplanting mica for this purpose to a large extent.

High-potential condenser mica must be clear or only slightly stained, must split easily and smoothly into films as thin as one-thousandth of an inch, and must be free from cracks, holes, foreign substances, stains, spots, and air bubbles, and the sheets must be plane and smooth, free from waves, wrinkles, rulings, or knots.

Mica used between the copper segments of commutators must possess high dielectric strength; that is, it must be able to withstand charges of high-voltage electrical current, and be soft enough to wear down evenly with the copper segments. High-grade Indian white mica is considered by some to be preferable for this use, as it has the requisite softness, and its purity and uniformity are additional factors desired. Phlogopite or "amber" mica is also extensively used for this purpose. It is even softer than the Indian, but it is not preferred by some manufacturers because of the greater difficulty in detecting impurities along the cleavage planes, and also because of its lower resistance to heat. For all other insulation, however, the domestic muscovite is satisfactory.

The quality of resonance possessed by mica makes it of special value for use in sound-producing and sound-detecting devices such as phonographs, submarine detectors, radiophones, and loud speakers.

Phonograph and other diaphragm mica must be of a very high grade; it must be clear and transparent, free from all cracks, inclusions, stains, air bubbles, or rulings, and must also split easily into perfectly flat sheets, the latter feature being essential.

Mica also finds application in the stove industry for glazing in the fronts of stoves, in furnace sightholes, for screens in front of highly heated material, for optical lanterns as a retarder of heat waves, and for making lamp chimneys, lamp shades, and lantern slides.

Stove mica is essentially clear, hard, and rigid, and much of the North Carolina mica, especially the greenish, is well adapted for this use. The demand for mica for glazing is comparatively small, and only the best quality and the larger sheets are thus used.

Mica for lamp chimneys and canopies must be clear and must split easily and be very flexible. Very little domestic mica is used for this purpose. Indian and Brazilian mica are used instead.

Mica splittings for built-up mica board, which is used in electric insulation, consist of thin flakes or films split from the smaller sheets of mica. Splittings are about one-thousandth of an inch in thickness, are irregular in shape, and contain a very small number of flaws. The built-up product is prepared by first coating a surface with shellac or other binder and laying the flakes thereon irregularly in a single layer. A second coat of binder and layer of flakes is then laid over them in such a manner as to cover the spaces between the flakes of the first layer. This process is continued until any required thickness is reached, when the whole is subjected to pressure and baking. In this way large composite sheets are made of uniform thickness, which are free from foreign substances and such imperfections as tend to lessen the value of mica for some insulating purposes. The finished product may be bent, cut, sawed, or drilled. Mica board is used chiefly for plates between the copper segments of commutators, and in dynamos, motors, and transformers.

Scrap and ground mica.—Mica which is not suitable for use as sheet mica is classed as "scrap" mica. It is ground to a powder and used in the decorative trade in the manufacture of wall paper, fancy paint, ornamental tile, and concrete facing, and for other purposes; as a lubricant both dry, as for auto tires, and mixed with oil and greases; for axle grease; for annealing steel; as a dusting agent for rolled roofing; for the manufacture of Christmas tree snow; as an insulator for pipe and boiler covering; fireproof paint; and in various other ways.

Consumption of ground mica.—The following figures distribute the 1926 sales of ground mica by methods of grinding and by consuming industries in the United States, in so far as reported by producers. The figures do not represent the total production of ground mica in the United States, for in addition to the part of the production which is shipped to foreign consumers there is also unaccounted for a part of the scrap-mica output which has not been traced to points of consumption where it may be ground by the consumers.

Ground mica sold in the United States, 1923–1926, by methods of grinding

Year	Dry ground		Wet ground		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
1923	5,660,000	$123,450	4,203,000	$250,170	9,863,000	$373,620
1924	5,184,000	101,700	5,735,000	331,410	10,919,000	433,110
1925	5,043,020	101,680	4,803,930	279,940	9,846,950	381,620
1926	4,750,790	98,290	4,980,400	206,370	9,731,190	304,660

Ground mica sold to various industries in the United States in 1926

Industry	Quantity		Value
	Pounds	Percentage	
Rubber	3,309,710	34	$124,393
Wall paper	2,519,540	26	108,558
Roofing	1,217,000	12	24,657
Miscellaneous [1]	2,684,940	28	36,552
	9,731,190	100	304,660

[1] Figures cover mica used for Christmas tree snow, surfacing on asphalt shingles, molded electric insulation, manufacture of axle greases and oil, annealing, concrete facing, and fancy paints.

Mica used in the wall-paper trade is practically all ground to 160 mesh by the wet process. For the rubber industry, as for auto tires, it is ground by both the dry and wet processes to 100, 160, and 200 mesh; for the roofing industry it is ground by the dry process to the following meshes: 6–15, 20, 20-special, and 24.

Descriptions of the dry and wet processes for grinding mica are contained in the Bureau of Mines Report of Investigation by W. M. Myers. Serial No. 2798, March, 1927.

Consumption of mica splittings.—The consumption of mica splittings in the United States in 1926, as reported by consumers, was as follows: Indian splittings, 2,775,924 pounds, valued at $1,489,681; Canadian splittings, 347,285 pounds, valued at $306,343; and Madagascan splittings, 193,682 pounds, valued at $143,153. These figures may not fully represent consumption, as it is possible that some domestic and South American splittings were used by consumers who have not responded fully to the inquiries made of them.

OCCURRENCE

Deposits of white mica (muscovite) of commercial importance occur only in pegmatite, an igneous rock similar to granite in composition but much coarser grained. The chief minerals of pegmatite are quartz, feldspar, and mica, but the rock also contains smaller quantities of other minerals, such as tourmaline, garnet, and beryl. The mica in the pegmatite dikes is in the form of more or less imperfect crystals called "blocks" or "books," which may be rudely hexagonal, and which range in width from a few inches to several feet, and in thickness from a fraction of an inch to several inches. The terms "book mica" or "block mica" applied to domestic mica are synonymous with "mine-run" or "run-of-mine" mica. When these blocks

of mine-run mica are split into thin sheets, about one-sixteenth of an inch in thickness, and the unusable waste removed, the mica is called "sheet" and the waste is called "scrap" mica. Only a small proportion of the blocks, averaging about 10 per cent, is convertible into marketable sheets.

Mica also occurs as small flakes or scales in granite, gneiss, schist, sandstone, and shale, but on account of the small size of such flakes and the impracticability of separating them from the abundant quartz and other hard minerals present, their value as a source of scrap mica is doubtful.

MINING

Mica deposits are seldom prospected by boring or drilling. The usual method is to prospect by pits, crosscuts, shafts, and tunnels. It is best to try to determine the extent of the deposit on the surface by a series of open cuts across the trend of the mica-bearing dike. The dike should also be tested for depth by one or more shafts. If a quantity of fairly large sheets of mica is not obtained, it may not be profitable to continue operations, but if mica is obtained that will cut into perfect sheets several inches square and as clear as window glass, the deposit may prove of value.

Mica mining in the United States is not carried on regularly or systematically by every producer. Many of the mines are worked by small operators who mine only intermittently and use very primitive methods. Operations are frequently of the type known as "gophering" or "groundhogging," which consists of following the blocks of mica as long as the removal of one discloses the presence of another—in other words, obtaining all the mica available without reference to any system of development. This method is popular in some parts of the South and is considered efficient where the run of mica in a deposit is not constant. In this type of workings the waste rock is left to accumulate because of the difficulty of removing it through the small tunnels and openings, and this method soon becomes a hindrance to future development. Improved methods of mining by systematic shafts, tunnels, drifts, stopes, and crosscuts have in some places supplanted the gophering method, and some mines have been equipped with hoists, power drills, pumps, and electric lights, but many mines have not been supplied with such modern equipment.

In some large masses of pegmatite regular quarry methods may be used. This system is common in the New England mica mines where mica is mined in open pits and derricks and inclined tracks are used to remove ore and waste.

PREPARATION

Mica as mined consists of rough crystals or blocks that range from a few inches to several feet across. These rough crystals are cobbed and cleaned of adhering quartz, feldspar, or dirt by rapping them with hammers, or they are cleaned with stout knives. Such mica is commonly referred to as "mine run," and in some sections of the country, principally New Hampshire, it is sold in this form. The cleaned crystals are thrown into boxes, which are sent to the culling shed. The crystals, which may be several inches thick, are first broken into plates about one-fourth of an inch thick. The edges of these plates are sometimes hammered, in order to loosen the laminæ

and soften the sides for the insertion of the splitting knife, which is a double-edged implement about 3 inches long with a V point. The sheets of mica are split into thicknesses of one-sixteenth of an inch or less. The rough edges are cut from these plates by knives held at an angle to the cleavage, and the mica is graded for size and quality. Mica of this grade is known in the trade as uncut sheet mica, and in this form it is sold by the miners to manufacturers. The mica is then cut or punched by the manufacturing concerns into patterns desired by the trade. For this purpose large shears and punches are used, operated either by hand or by power. If shears are used, the mica is cut into the desired form around a templet of wood, metal, or composition laid against the mica. Mica-punching machines are supplied with dies to punch disks, washers, and other shapes. Mica in this form is called "cut sheet" mica.

Naturally a good deal of waste or scrap mica results from the cutting, splitting, trimming, and punching operations; this is utilized by mica grinders in the manufacture of ground mica. The waste product of the mills or "shop scrap" usually brings a higher price than scrap mica which is obtained directly from the mines, called "mine scrap," because it is cleaner and is freer from gritty material.

CLASSIFICATION

Mica is valuable in sheet form and as scrap suitable for grinding into a powder. For commercial sheet mica the individual pieces must be large enough to contain a rectangular area measuring at least 1½ by 2 inches, which must split easily and evenly and be nearly free from "cracks," "rulings," "markings," and all fracture lines and reasonably free from inclusions or specks of foreign mineral matter. The size stated is the smallest rectangular size that is salable in the form of uncut sheet; the irregularly bounded rough-trimmed mica sheet must be nearly twice as large to yield this size—in other words, a sheet that would yield a suitable rectangle 1½ by 2 inches and would be classed as "1½ by 2 inches" would have to measure nearly 3 by 4 inches.

Splittings are the thin films or flakes of mica that are split from the smaller sheet or waste material. They are about one-thousandth of an inch thick and are irregular in shape.

Material suitable as scrap mica for grinding must be free from all foreign matter, especially gritty material such as quartz and feldspar.

The system of classification of mica, by sizes, is different in the United States, Canada, and India. The United States classification is as follows (figures represent inches): Punch, circle, 1½ by 2, 2 by 2, 2 by 3, 3 by 4, 3 by 5, 4 by 6, 6 by 6, 6 by 8, 8 by 10, and larger. For punch mica the uncut sheet must be of sufficient size to yield a circle 1½ inches in diameter if stained and 1¼ inches if clear; circle mica should yield a disk nearly 2 inches in diameter.

Canadian or "amber" mica is also classified on the basis of the size of the rectangle obtainable, but the sizes differ from those used for the United States mica. The sizes used for Canadian mica, in inches, are 1 by 1, 1 by 2, 1 by 3, 2 by 3, 2 by 4, 3 by 5, 4 by 6, and 5 by 8.

The Indian classification is not based on the size of the rectangle obtainable but on the area of usable mica in the sheet. The following table shows the Indian system of grading, with the approximate corresponding sizes used in the United States classification:

Grading of Indian mica

Grade	Area of usable mica (in square inches), based on rectangular sizes	Sizes of rectangles that can be cut (in inches)				Approximate corresponding sizes in United States classification (in inches)
		Width		Length		
		Minimum	Maximum	Minimum	Maximum	
6	Less than 3					Punch.
5	3 to 5⅞	1	2	2	2½	2 by 2.
4	6 to 9⅞	1½	2½	2½	3	2 by 3. 3 by 3.
3	10 to 14⅞	1½	3	3	4½	3 by 4.
2	15 to 23⅞	1½	3½	4½	6	3 by 5.
1	24 to 35⅞	3	5	5	7	4 by 6.
A–1	36 to 47⅞	4	6	7	9	5 by 8.
Special	48 to 59⅞					6 by 8.
Extra special	60 to 71⅞					8 by 8.
Extra extra special	72 and more					8 by 10.

MINERALS ALLIED TO MICA

The materials allied to mica by similar constitution, physical characteristics, and uses include the following: (1) Vermiculite; (2) clinochlore ("chlorite schist"); and (3) muscovite mica schist.

(1) The term "vermiculite" is applied to a form of altered biotite and phlogopite mica, the alteration being accompanied by the oxidation of the iron and the introduction of considerable water. The variety of altered biotite to which the name vermiculite was originally applied exfoliates greatly on being heated, some varieties slowly exfoliating into wormlike threads, which gave the name vermiculite to the group. The material is said to be suitable for insulation or filtration purposes, for use in the manufacture of wall paper, roofing materials, and in other ways.

A deposit of this material in Custer County, Colo., near Westcliffe, owned by the Jefferisite Products Co., 902 Patterson Building, Denver, was reported a few years ago by the company to be under development, but no commercial production has been reported by the company to the Bureau of Mines. A small production was reported a few years ago from another deposit called the Inspiration mine, owned by D. E. C. Austin, Turret, Chaffee County, Colo. The deposit of similar altered mica which occurs near Libby, Mont., is being developed by the Zonolite Co., Spokane, Wash. The product, after being heated, is called "zonolite," and the company has reported a small production for the last two years.

(2) Chlorite schist, consisting chiefly of the mineral clinochlore, has been mined and sold for many years at Canton, Ga., by the American Mica Co., 7 Hanover Street, New York City. Clinochlore occurs as crystals with a cleavage like mica, the cleavage plates, however, being only slightly elastic; it is also found in compact masses made up of fine scales. It is used in the same manner as ground mica; that is, it is ground to various meshes and used chiefly in the manufacture of roofing materials, and to some extent in the manufacture of hard rubber goods, automobile tires, foundry facing, and lubricants. The American Mica Co. reported that it had discontinued operations at Canton, and no successor was named. There was no production in 1926.

(3) Muscovite mica schist was mined and sold in 1926 by the Nassau Producing Corporation, Spruce Pine, N. C. The mines of this corporation are located in three counties in North Carolina, but most of the production came from Mitchell County. The product was all sold in the ground form to roofing manufacturers.

IMPORTS AND EXPORTS

Mica imported for consumption in 1926 included unmanufactured, ground, cut (dimension sheets), splittings, built-up mica boards, cups, tubes, and mica plates, washers, and other manufactures. Imports of unmanufactured mica, exclusive of the Madras square-shaped uncut sheets, increased 35 per cent in quantity and 7 per cent in value. Imports of ground mica decreased 85 per cent in quantity and 84 per cent in value. Cut mica (dimension sheets) increased 13 per cent in quantity and decreased 30 per cent in value. Mica splittings, which constituted 83 per cent of the total quantity of mica imported, were 61 per cent greater in quantity and 57 per cent in value than in 1925. Imports of built-up mica boards, etc., increased 3 per cent in quantity and decreased 8 per cent in value, and the imports of washers were more than 20 times the quantity and 30 times the value of those for 1925.

The imports of uncut sheet mica, exclusive of the Madras square-shaped uncut sheets, in 1926 were 818,381 pounds, valued at $562,300.

Mica imported for consumption in the United States, 1921–1926

Kind	1921		1922		1923	
	Pounds	Value	Pounds	Value	Pounds	Value
Unmanufactured [1]	328,444	$331,219	385,653	$359,793	1,044,366	$532,375
Cut and split [2]	[3]	758,521	[3]	[4] 555,243	[4]	[4]
Ground	134,650	2,166	313,745	4,514	1,867,385	28,324
Cut mica (dimension sheets)	[6]	[6]	[5] 42,579	[5] 18,372	60,135	49,268
Splittings			[5] 1,063,306	[5] 371,801	4,301,727	1,730,532
Built-up mica boards, cups, tubes, and mica plates			[5] 1,807	[5] 2,860	30,032	37,382
Washers			[5] 2,562	[5] 675	20,164	6,776
Other manufactures			[5] 7,842	[5] 17,364	7,044	20,191
		1,091,906		1,330,622	7,330,853	2,404,848

Kind	1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value
Unmanufactured [1]	671,793	$419,154	604,550	$526,292	818,381	$562,300
Ground	1,342,107	22,034	950,614	13,120	140,732	2,048
Cut mica (dimension sheets)	74,534	69,018	41,284	63,466	46,662	44,621
Splittings	3,619,229	1,681,774	3,239,554	1,113,202	5,229,858	1,750,434
Built-up mica boards, cups, tubes, and mica plates	18,205	41,455	14,639	16,785	15,147	15,410
Washers	18,517	5,325	222	50	4,620	1,723
Other manufactures	56,766	88,146	50,445	65,912	62,696	74,298
	5,801,151	2,326,906	4,901,308	1,798,827	6,318,096	2,450,834

[1] Essentially uncut trimmed sheets.
[2] Includes the Madras square-shaped uncut sheets.
[3] Quantities not recorded prior to change in tariff, Sept. 22, 1922.
[4] Classification discontinued with change in tariff and items shown separately.
[5] Sept. 22–Dec. 31.
[6] Not separately classified prior to Sept. 22, 1922.

The import duty on mica as fixed by the tariff act of September 22, 1922, paragraph 208, is as follows:

Mica, unmanufactured, valued at not above 15 cents per pound, 4 cents per pound, valued above 15 cents per pound, 25 per cent ad valorem; mica, cut or trimmed, and mica splittings, 30 per cent ad valorem; mica plates, and built-up mica, and all manufactures of mica or of which mica is the component material of chief value, 40 per cent ad valorem; ground mica, 20 per cent ad valorem.

The following table showing mica imported (general imports) into the United States by kinds and by countries indicates that imports from India formed 74 per cent of the total. Mica from India is uncut sheet and splittings, but the proportions are not known. Although Madras square-trimmed mica is termed "cut mica" in import schedules, in reality it is uncut trimmed mica. Canada was the second largest shipper to the United States, and furnished 12 per cent of the total imports. Mica from Canada is phlogopite, and that from India is muscovite. Eighty-six per cent of the mica imported into the United States in 1926 came from these two countries.

Mica imported into the United States in 1926, by kinds and by countries

[General imports]

Country	Crude or unmanufactured				Cut mica, dimension sheets (duty 30 per cent)		Mica splittings (duty 30 per cent)		Ground mica (duty 20 per cent)		Built-up mica products, boards, cups, tubes, and mica plates (duty 40 per cent)		Washers (duty 40 per cent)		Other manufactures, not specially provided for (duty 40 per cent)		Total	
	Valued at not above 15 cents per pound (duty 4 cents per pound)		Valued at above 15 cents per pound (duty 25 per cent)															
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Aden			2,229	$703													2,229	$703
Africa:																		
British—																		
East			7,347	5,500													7,347	5,500
South	9,765	$919	32,383	10,929			2,744	$640									44,892	12,488
Portuguese—															2,005	$704	7,323	2,260
East	798	65	2,378	991			2,142	500									10,348	2,446
Other							10,348	2,446									100,347	63,212
Argentina	648	90	99,699	63,122													672	639
Australia			318	458	354	$181					402	$1,691			2,367	6,582	2,794	8,296
Austria					25	23											1,331	1,134
Bolivia					1,331	1,134											52,679	48,385
Brazil			52,646	48,330	33	55							60	$55	471	2,476	852,546	448,995
Canada	39,739	4,857	48,349	18,868	5,327	4,599	634,140	416,371	124,460	$1,769							6,750	11,946
Ceylon			6,750	11,946													6,181	1,865
Chile			6,181	1,865													7,161	5,384
China			5,244	3,661	500	1,471	1,417	252							2,250	5,818	262,377	155,633
France	1,936	228	17,843	6,951			235,417	134,270			4,931	8,366			28,274	29,668	40,322	39,344
Germany			4,194	4,994			6,381	1,085			1,473	3,597			9,234	2,174	22,265	14,552
Guatemala			5,908	6,834	7,123	5,544									16,644	19,916	5,207,516	1,680,696
India, British	5,150	578	293,037	240,452	41,280	36,955	4,828,437	1,376,566	16,272	279	4,696	4,742	2,000	1,208			1,380	1,838
Japan			1,380	1,838													7,513	3,085
Madagascar			4,526	1,680			2,987	1,405									657	928
Soviet Russia in Europe			657	928											193	450	228	613
Switzerland					35	163					552	134			9,779	19,627	358,043	288,000
United Kingdom	1,277	114	169,590	177,378	2,987	6,336	173,858	84,411										
Total	59,313	6,851	760,659	607,428	58,995	56,461	5,897,871	2,017,946	140,732	2,048	12,054	18,530	2,060	1,263	71,217	87,415	7,002,901	2,797,942

Mica and manufactures of mica exported in 1926 consisted of 2,326,131 pounds, valued at $230,511, compared with 2,422,197 pounds, valued at $198,596, in 1925. As the classes of mica are not shown in export schedules, it is not possible to state what kinds of mica are exported.

WORLD'S PRODUCTION

World's production of mica, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country	1922	1923	1924	1925	1926
North America:					
Canada	3,038	3,197	3,711	3,647	2,309
Guatemala	(1)	(1)	(1)	16	12
United States	6,514	8,243	4,934	9,609	7,374
South America:					
Argentina [2]	64	87	120	119	(1)
Brazil [2]	67	56	79	65	52
Europe:					
Germany (Saxony)				501	(1)
Norway [2]	1	10	25	23	(1)
Rumania		6			
Russia	8	(1)	(1)	(1)	(1)
Spain		3			
Sweden	8	5	4	95	(1)
Asia:					
Ceylon [2]	1	1		1	(1)
Chosen	19	11	23	20	16
India, British [3]	2,192	4,232	3,561	5,065	4,569
Japan	15	431	592	1,082	(1)
Africa:					
Madagascar [2]	92	165	286	267	296
Rhodesia—					
Northern					4
Southern	60	83	136	132	166
Tanganyika Territory [2]	11	33	58	53	52
Union of South Africa (Transvaal)	3	14	735	1,462	872
Oceania:					
Australia—					
Northern Territory	1	3	3	3	3
Queensland	(4)			1	
Western Australia [2]	2				4

[1] Data not available.
[2] Exports.
[3] Exports. The figures for output are incomplete and a more accurate idea of the size of the industry is to be obtained from the export figures. (Rec. Geol. Surv. of India, vol. 59, pt. 3, p. 273. Calcutta, 1926.) Output is reported as follows: 1922, 1,619 tons; 1923, 1,720 tons; 1924, 2,078 tons; 1925, 2,336 tons; 1926, data not available.
[4] Less than one-half ton.

World's production of sheet mica, 1922–1926, in metric tons

Year	United States	India [1]	Canada	Other countries [2]	Total	United States percentage of total
1922	489	2,192	179	351	3,211	15
1923	936	4,232	412	898	6,478	14
1924	663	3,561	618	2,036	6,878	10
1925	814	5,065	435	3,818	10,132	8
1926	985	4,569	278	(3)	(3)	(3)

[1] Exports.
[2] Data incomplete, as no figures of production are available for some of the countries.
[3] Data not available.

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PHOSPHATE ROCK[1]

PHOSPHATE ROCK SOLD

In 1926 the quantity of phosphate rock sold or used by producers in the United States amounted to 3,209,976 long tons. This is less by 271,843 tons, or 8 per cent, than that of 1925, but is more than was sold in any other year except the record year 1920. The total value of the rock sold in 1926 was $10,893,800, a decrease of $651,878, or 6 per cent, as compared with 1925. The average selling value per ton for 1926 was $3.39, whereas that for 1925 was $3.32, an increase of 7 cents per ton. The quantity sold or used in 1926 was less than the quantity mined by 382,046 tons, or 11 per cent. There were 26 producers of phosphate rock in 1926.

In this report the unit of quantity used in referring to phosphate rock is the long ton (2,240 pounds), except as otherwise specified. The value of domestic material means the selling value f. o. b. mines, so far as that can be determined from the returns submitted by the respective companies. Some of the companies, however, ship their rock to drying plants before selling, and others sell the rock f. o. b. foreign ports. Therefore the figures may be somewhat higher than the value at the mine, because of error in interpreting reports of some companies who may have included an undetermined charge for transportation.

Phosphate rock sold or used by producers in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	2,584,287	$7,771,084	1922	2,417,883	$10,482,846
1918	2,490,760	8,214,463	1923	3,006,706	11,576,049
1919	2,271,983	11,591,268	1924	2,867,789	10,252,083
1920	4,103,982	25,079,572	1925	3,481,819	11,545,678
1921	2,064,025	12,270,070	1926	3,209,976	10,893,800

The sales of raw phosphate for direct application to the soil reached a maximum in 1919, as shown in the following table. In 1921 there was a sharp break in this business, and sales remained relatively low until 1925, when they amounted to 31,999 tons. In 1926 sales for this purpose amounted to 29,902 tons, or 38 per cent of the peak sales in 1919 and a decrease of nearly 7 per cent from 1925. Tennessee supplied all of the material in 1926.

[1] The statistics on domestic industry in this report were prepared by B. H. Stoddard, and the data on imports and exports were compiled from the records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, both of the Bureau of Mines.

Raw phosphate rock sold by producers in the United States for direct application to the soil, 1917–1926, in long tons

1917	75, 861	1922	16, 029
1918	45, 294	1923	10, 548
1919	79, 189	1924	14, 320
1920	72, 801	1925	31, 999
1921	13, 503	1926	29, 902

The phosphate rock sold to blast furnaces in 1926 was 23,231 tons, a decrease of 10 per cent from 1925. The quantity sold for the manufacture of phosphorus and chemicals containing phosphorus was 149,072 tons, an increase of 15 per cent over 1925. The quantity of phosphate rock sold as an ingredient for stock food was 4,911 tons, an increase of 2,306 tons, or 89 per cent, over 1925. The demand for concrete aggregate in Florida in localities where sand and gravel were not always available caused the marketing of some phosphate rock for this purpose during 1926. The quantity so reported was less than 3,000 tons.

PHOSPHATE ROCK MINED

The quantity of rock mined in any year is not the same as the quantity sold or used, and stocks at the mines on December 31 differ from year to year. The quantity of rock mined in 1926 was 3,592,022 long tons, an increase of 338,351 tons, or 10 per cent, over 1925.

Phosphate rock mined in the United States, 1917–1926, by States, in long tons

Year	Florida	South Carolina	Tennessee and Kentucky	Western States	Total
1917	2, 328, 138	45, 541	461 773	16, 434	2, 851, 886
1918	1, 884, 891	33, 673	353, 726	11, 955	2, 284, 245
1919	1, 254, 609	49, 032	530, 973	16, 935	1, 851, 549
1920	3, 255, 720	42, 709	627, 677	48, 895	3, 975, 001
1921	2, 088, 251		332, 962	4, 961	2, 426, 174
1922	2, 018, 809		300, 566	17, 481	2, 336, 856
1923	2, 421, 571		487, 420	34, 575	2, 943. 566
1924	2, 373, 530		431, 038	40, 735	2, 845, 303
1925	2, 672, 650	2, 147	495, 072	83, 802	3, 253, 671
1926	3, 064, 441		481, 839	45, 742	3, 592, 022

STOCKS

Precise measurement of stocks of phosphate rock in the hands of producers is difficult. The estimate of stocks on December 31, 1925, amounted to about 500,000 tons. Adding to this the quantity mined during 1926 and subtracting from the sum the sales during the year gives an estimate of 880,000 tons on hand December 31, 1926.

REVIEW BY STATES

In 1926 both the quantity and the total value of phosphate rock sold or used by producers in each of the States decreased.

Phosphate rock sold or used by producers in the United States, 1925–26, by States

State	1925		1926	
	Long tons	Value	Long tons	Value
Florida:				
Hard rock	171,649	$707,933	116,264	$465,308
Land pebble	2,758,315	8,081,137	2,591,943	8,218,200
	2,929,964	8,789,070	2,708,207	8,683,508
South Carolina: Land rock	2,147	8,051		
Tennessee and Kentucky: Brown and blue rock	477,077	2,429,059	464,192	2,048,272
Western States:				
Idaho	65,934	289,498	33,113	133,020
Wyoming	6,697	30,000	4,464	29,000
	3,481,819	11,545,678	3,209,976	10,893,800

FLORIDA

Although the sales of phosphate rock by producers in Florida in 1926 decreased 8 per cent in quantity, this State continued to lead in production and was the source of 84 per cent of all the phosphate rock sold or used by producers in the United States in 1926. The sales were made by 10 producers. The increase in quantity and value during 1925 was caused by the stronger European demand for high-grade phosphate during the latter part of the year.

Production of hard-rock phosphate has been declining for several years because of increased cost of production and the increased competition of North African phosphates in the European markets. No new mines are being developed, the number of the companies operating is less, and those that are busy are mining only from pits that have been stripped and developed. Indications are that the production of hard rock will decrease further, at least during the next few years.

Land-pebble rock constituted 96 per cent of the entire Florida output in 1926. Pebble rock sold in 1926 decreased in quantity but increased in value.

Florida phosphate rock sold or used by producers, 1917–1926

Year	Hard rock			Soft rock		
	Long tons	Value at mines		Long tons	Value at mines	
		Total	Average		Total	Average
1917	[1] 18,608	[1] $159,366	$5.93	(1)	(1)	$12.40
1918	62,052	377,075	6.08	8,331	$147,103	17.66
1919	285,467	2,452,563	8.59	14,498	196,318	13.54
1920	400,249	4,525,191	11.31	13,953	190,551	13.66
1921	175,774	1,806,671	10.28	4,419	20,153	4.56
1922	188,084	1,308,201	6.96	446	3,500	7.85
1923	199,516	1,071,675	5.37			
1924	143,115	629,579	4.40			
1925	171,649	707,933	4.12			
1926	116,264	465,308	4.00			

[1] Soft rock included with hard rock.

Florida phosphate rock sold or used by producers, 1917–1926—Continued

Year	Land pebble			Total		
	Long tons	Value at mines		Long tons	Value at mines	
		Total	Average		Total	Average
1917	2,003,991	$5,305,127	$2.65	2,022,599	$5,464,493	$2.70
1918	1,996,847	5,565,928	2.79	2,067,230	6,090,106	2.95
1919	1,360,235	5,149,048	3.79	1,660,200	7,797,929	4.70
1920	2,955,182	14,748,620	4.99	3,369,384	19,464,362	5.78
1921	1,599,835	8,604,818	5.38	1,780,028	10,431,642	5.86
1922	1,870,063	7,035,821	3.76	2,058,593	8,347,522	4.05
1923	2,348,137	7,987,752	3.40	2,547,653	9,059,427	3.56
1924	2,289,466	7,387,897	3.23	2,432,581	8,017,476	3.30
1925	2,758,315	8,081,137	2.93	2,929,964	8,789,070	3.00
1926	2,591,943	8,218,200	3.17	2,708,207	8,683,508	3.21

Prices of Florida pebble rock rise rapidly with increase in content of tricalcium phosphate (known in the trade as "B. P. L."—that is, bone phosphate of lime), as shown in the following table:

Prices of pebble phosphate per long ton, f. o. b. Florida [3]

Export prices:		Domestic prices:	
76 to 77 per cent	$7.00	76 to 77 per cent	$6.00
75 per cent	6.25	75 per cent	5.25
74 to 75 per cent	6.00	74 to 75 per cent	5.00
70 per cent	4.50	72 per cent	4.00
68 per cent	4.10	70 per cent	3.50
66 per cent	4.00		

TENNESSEE AND KENTUCKY

The total quantity of phosphate rock sold or used by producers in Tennessee and Kentucky in 1926 decreased 3 per cent from 1925. The value decreased 16 per cent. As only one producer reported from Kentucky for 1926, figures for that State are included with those for Tennessee, where the number of producers totaled 12. Likewise, there was but one producer of Tennessee blue rock, so the figures have been combined with those for brown rock.

Tennessee and Kentucky phosphate rock sold or used by producers, 1917–1926

Year	Brown rock			Blue rock			Total		
	Long tons	Value at mines		Long tons	Value at mines		Long tons	Value at mines	
		Total	Average		Total	Average		Total	Average
1917	447,203	$1,920,533	$4.29	65,904	$205,820	$3.12	513,107	$2,126,353	$4.14
1918	[a] 374,535	[a] 1,917,546	[a] 5.12	(a)	(a)	(a)	374,535	1,917,546	5.12
1919	475,475	3,123,565	6.57	58,550	290,951	4.97	534,025	3,414,516	6.39
1920	556,177	4,425,761	7.96	78,671	518,234	6.59	634,848	4,943,995	7.79
1921	252,543	1,666,358	6.60	25,163	146,198	5.81	277,706	1,812,556	6.53
1922	344,231	2,055,579	5.97	9,078	51,803	5.71	353,309	2,107,382	5.96
1923	427,799	2,335,262	5.46	919	5,647	6.14	428,718	2,340,909	5.46
1924	375,260	1,958,272	5.22	21,378	81,766	3.82	396,638	2,040,038	5.14
1925	[a] 477,077	[a] 2,429,059	[a] 5.09	(a)	(a)	(a)	477,077	2,429,059	5.09
1926	[a] 464,192	[a] 2,048,272	[a] 4.41	(a)	(a)	(a)	464,192	2,048,272	4.41

[a] Blue rock included with brown rock.

[3] Engineering and Mining Journal, vol. 123, Jan. 8, 1927, p. 78.

WESTERN STATES

The decrease in the quantity of phosphate rock sold or used by producers in the Western States in 1926 was 48 per cent as compared with 1925. The average value per ton in 1926 was $4.31, compared with $4.40 in 1925. In 1926 there were two producers in Idaho and one in Wyoming.

Western States phosphate rock sold or used by producers, 1917–1926

Year	Long tons	Value at mines		Year	Long tons	Value at mines	
		Total	Average			Total	Average
1917	15,096	$41,756	$2.77	1922	4,481	$19,692	$4.39
1918	11,955	42,161	3.53	1923	30,335	175,713	5.79
1919	16,935	69,855	4.12	1924	38,570	194,569	5.04
1920	55,609	304,006	5.47	1925	72,631	319,498	4.40
1921	6,291	25,872	4.11	1926	37,577	162,020	4.31

IMPORTS OF PHOSPHATIC FERTILIZERS

The phosphatic fertilizers imported in 1926 were bone dust or animal carbon, bone ash, guano, crude phosphates, and basic slag. Imports of the bone-dust group increased in both quantity and value compared with 1925. Imports of guano declined 33 per cent in quantity and 41 per cent in value. The quantity of crude phosphates was more than six times that imported in 1925. The quantity of basic slag imported increased 49 per cent over 1925. Imports of phosphatic materials for the last five years are shown in the following table:

Phosphatic fertilizers imported for consumption in the United States, 1922–1926

Fertilizer	1922		1923		1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Bone dust, or animal carbon, and bone ash, fit only for fertilizing	32,274	$860,683	54,143	$1,691,330	22,242	$706,727	24,981	$724,473	46,715	$1,380,103
Guano	13,007	514,325	28,599	1,104,003	25,241	754,234	17,407	730,046	11,673	430,203
Phosphates, crude	5,890	95,846	6,725	92,263	16,098	181,515	2,735	37,932	17,378	192,611
Slag, basic, ground or unground	324	9,762	361	6,843	703	9,598	181	2,815	269	3,485

EXPORTS OF PHOSPHATE ROCK

Exports of phosphate rock from the United States in 1926 decreased 14 per cent in quantity and 22 per cent in value as compared with 1925. The following tables show total exports of phosphate rock for the last 10 years and give the destinations of exports for the last 5 years.

Phosphate rock, ground or unground, exported from the United States, 1917–1926

Year	High-grade rock		Land pebble		Other		Total	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
1917	12,403	$113,392	138,010	$548,203	15,945	$173,450	166,358	$835,045
1918	57,771	445,419	64,559	303,758	21,125	163,308	143,455	912,485
1919	215,039	2,261,852	128,860	904,308	34,832	401,822	378,731	3,567,982
1920	344,896	4,496,457	693,355	5,593,814	31,461	479,904	1,069,712	10,570,175
1921	182,594	2,592,541	544,425	4,627,875	6,293	99,721	733,312	7,320,137
1922	202,300	2,548,587	512,777	3,269,179	4,217	40,401	719,294	5,858,167
1923	194,339	2,477,501	630,565	3,273,006	2,647	21,664	827,551	5,772,171
1924	150,746	1,814,194	656,005	3,209,965	12,022	96,673	818,773	5,120,832
1925	158,985	2,283,076	697,891	3,287,370	13,324	107,317	870,200	5,677,763
1926	103,572	1,195,729	634,362	3,155,732	11,029	84,129	748,963	4,435,590

Phosphate rock, ground or unground, not acidulated, exported from the United States, 1922–1926, by countries

HIGH-GRADE ROCK

Country	1922		1923		1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Australia									12,500	$187,500
Belgium	32,200	$483,000	33,650	$484,950	19,500	$292,500	28,000	$420,000	16,125	219,275
Canada	3,892	47,045					1,490	7,826	2,443	10,784
Denmark	4,400	66,000								
Finland	5,650	74,759								
Germany	113,118	1,335,372	134,586	1,700,187	92,021	1,031,819	90,374	1,284,285	23,525	232,775
Mexico									4	70
Netherlands	19,991	258,021	8,140	77,720	26,494	355,195	35,221	512,465	12,175	152,225
New Zealand									12,625	136,575
Norway	3,200	48,000							2,100	36,500
Poland and Danzig	16,349	183,890	11,420	171,300	6,000	90,000	3,900	58,500	8,775	106,925
Spain			3,000	15,000						
Sweden	3,500	52,500			6,731	44,680			13,300	113,100
United Kingdom:										
England			3,543	28,344						
	202,300	2,548,587	194,339	2,477,501	150,746	1,814,194	158,985	2,283,076	103,572	1,195,729

LAND PEBBLE

Argentina			1,700	$7,650						
Australia									36,236	$227,257
Belgium	53,793	$309,183	61,434	336,874	38,469	$196,636	36,731	$184,338	43,551	220,443
British South Africa	3,000	17,250			6,620	34,755	21,592	117,456	13,513	75,297
Canada	9,895	75,028	10,031	54,468	7,019	40,551	12,957	65,987	14,060	74,832
Cuba	9,017	26,073	23,433	83,022	33,672	156,455	5,825	31,815	14,529	70,754
Denmark	54,605	429,984	57,425	330,323	38,072	171,176	39,783	189,011	69,868	362,541
Finland			2,000	14,000						
France	27,149	185,121	31,466	180,509	8,798	43,641	3,310	15,343		
Germany	51,578	283,918	133,948	701,883	129,213	628,143	92,946	529,072	65,559	338,440
Greenland			3,685	16,597						
Irish Free State	(1)	(1)	(1)	(1)	(1)	(1)	3,300	10,725		
Italy			20,915	96,540	58,419	290,391	69,927	330,373	86,927	439,382
Japan	8,201	31,804	14,225	50,081	45,733	161,423	95,245	281,401	95,809	343,473
Netherlands	86,218	498,516	67,702	337,371	97,368	472,666	100,293	475,832	65,373	330,904
New Zealand									6,162	33,891
Nicaragua			3,029	15,931						
Norway					2,000	9,000	3,150	14,375		
Poland and Danzig			3,028	20,742	13,366	70,420	10,900	69,315	3,139	19,776
Spain	122,443	788,027	92,326	492,936	110,146	648,779	108,485	551,329	94,522	518,802
Sweden	17,464	108,457	10,609	62,551	12,023	64,762	61,233	294,504	5,839	32,115
United Kingdom:										
England	36,983	270,300	55,093	299,757	33,805	134,774				
Ireland	18,716	141,504	20,612	94,303	3,000	9,000	32,214	126,494	19,275	67,825
Scotland	13,715	104,014	17,904	77,468	18,282	77,393				
	512,777	3,269,179	630,565	3,273,006	656,005	3,209,965	697,891	3,287,370	634,362	3,155,732

[1] Included under "United Kingdom."

Phosphate rock, ground or unground, not acidulated, exported from the United States, 1922–1926, by countries—Continued

ALL OTHER PHOSPHATE ROCK

Country	1922		1923		1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Belgium									500	$2,000
Canada	4,196	$38,281	1,600	$17,137	10,941	$80,246	13,324	$107,317	6,649	61,301
Cuba					81	1,427				
Dominican Republic									60	200
Japan	2	20								
Netherlands									3,820	20,628
Newfoundland and Labrador			29	228						
Norway					1,000	15,000				
Sweden			1,006	4,024						
United Kingdom: Ireland	19	2,100								
West Indies ("Other British")			12	275						
	4,217	40,401	2,647	21,664	12,022	96,673	13,324	107,317	11,029	84,129

EXPORTS OF SUPERPHOSPHATES AND OTHER FERTILIZER MATERIALS

The accompanying table shows the export business in superphosphates (acid phosphates) and other fertilizer materials. Exports of superphosphates and prepared fertilizer mixtures decreased slightly in both quantity and value in 1926 as compared with 1925. There were decided increases in both quantity and value of sulphate of ammonia exported in 1926.

Fertilizers exported from the United States, 1917–1926

	1917		1918		1919		1920		1921	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Superphosphates (acid phosphates)	3,844	$106,778	6,991	$257,928	86,790	$2,774,856	80,993	$2,949,629	4,278	$96,303
All other fertilizers	174,592	5,627,304	74,115	3,359,497	188,586	14,567,032	205,666	15,602,658	55,239	2,602,277

	1922		1923		1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Superphosphates (acid phosphates)	26,781	$372,279	42,099	$534,446	45,751	$588,620	65,779	$988,914	64,452	$937,278
Prepared fertilizer mixtures	14,416	690,972	17,997	832,948	35,793	1,695,472	29,923	1,530,354	26,439	1,009,402
Nitrogenous fertilizer materials: Sulphate of ammonia	147,331	8,736,611	153,677	11,117,726	118,367	6,918,598	123,141	6,748,728	181,125	9,823,847
Calcium, cyanamid (lime of nitrogen)	2,556	26,112	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
other	1,663	84,274	13,291	614,814	4,699	283,154	6,802	367,435	.	566,306
All other fertilizers	25,462	898,061	45,073	1,921,972	44,942	1,901,722	46,509	1,985,335	72,164	3,267,562

[1] Not classified separately.

WORLD'S PRODUCTION

The following table shows the world's production of phosphate rock for the last five years:

World's production of phosphate rock, 1922–1926, by countries, in metric tons

[Compiled by L. M. Jones of the Bureau of Mines]

Country	1922	1923	1924	1925	1926
Algeria	484,304	467,384	681,136	815,116	929,355
Angaur Island	46,204	61,243	[1] 61,000	[1] 61,000	[1] 61,000
Australia:					
New South Wales	12	75	109	203	257
Queensland	66				
South Australia	2,759	453	85	754	896
Victoria	1,114	488	541		122
Belgium	56,840	23,270	26,250	15,125	[2]
Canada [3]	172	27		15	38
Chile [3]	500				[2]
Christmas Island (Straits Settlements) [4]	100,947	71,563	127,166	111,835	[2]
Egypt	60,220	25,370	87,869	106,778	232,008
Estonia	[2]	304		2,044	4,054
France	146,526	179,462	206,859	229,996	[2]
Germany: [3]					
Bavaria	4,412	2,975	1,000	200	
Prussia	657	2,311	399	123	542
Gilbert and Ellice Islands [5]	152,368	136,506	192,516	[2]	[2]
India (British)	1,362	4,838	6,529	1,504	[2]
Indo-China	7,600	9,847	12,461	30,236	14,911
Japan	12,320	33,107	85,617	87,375	[2]
Madagascar	[4] 5,210		[4] 749		6,135
Makatea Island [4]	71,350	74,230	89,611	81,061	127,177
Morocco, French	96,397	225,395	461,582	692,181	882,821
Nauru and Ocean Islands	[6] 367,000	[5] 318,794	[5] 459,162	[5] 478,278	[5] 398,059
Netherlands West Indies: Curaçao [4]	50,078	85,855	100,471	81,771	106,807
New Caledonia	5,142	12,932	[2]	12,000	50,000
New Zealand	3,178	2,421	1,600		
Norway [3]		222	345	467	343
Philippine Islands	2,050	3,781	6,528	7,528	7,512
Russia	14,136	21,044	20,014	33,315	[2]
Seychelles Islands [4]				3,208	[2]
Spain	6,492	5,397	6,746	5,315	5,656
Tunisia	2,117,650	2,338,000	2,391,000	2,691,000	2,568,000
United States	2,456,690	3,054,964	2,913,817	3,537,702	3,261,496

[1] Estimated.
[2] Data not available.
[3] Apatite.
[4] Exports.
[5] Exports during the fiscal year ended June 30 of year stated
[6] Production in the fiscal year ended June 30 of year stated.

SAND AND GRAVEL

By Estelle R. Phillips [1]

PRODUCTION

The production of sand and gravel reported as sold or used by producers in the United States in 1926 exceeded that of any previous year in both quantity and value and amounted to 183,100,818 short tons, valued at $111,338,701—an increase of 6 per cent in quantity and 4 per cent in value as compared with 1925. The increase in paving and road making sand and gravel and in that used for ballast and fills by railroads more than offset the 3 per cent decrease in quantity and 6 per cent decrease in value of building sand and gravel. Increased production was also shown in molding sand, grinding and polishing sand (including blast sand), fire or furnace sand, and engine sand.

The total sand in 1926 amounted to 92,114,279 tons, valued at $55,675,988, an increase of nearly 6 per cent in quantity but of less than 1 per cent in value as compared with 1925. The total gravel in 1926 amounted to 90,986,539 tons, valued at $55,662,713, an increase of 7 per cent in quantity and of 6 per cent in value over 1925.

Of the seven States producing more than 10,000,000 tons of sand and gravel in 1926, New York, with an output of over 19,000,000 tons, led in quantity, with Illinois, Michigan, California, Pennsylvania, Indiana, and Ohio following in order. In total value, Pennsylvania led, with New York a close second, and with California, Illinois, Ohio, Michigan, and Indiana following. The total value for each of these States exceeded $5,000,000, Pennsylvania and New York exceeding $11,500,000. West Virginia was first in average value per ton.

Nearly 140,000,000 tons, or over 76 per cent of the total output of sand and gravel, was classified by the producers as "washed" material. The proportion may have been larger, as much of the material reported by State, county, and town authorities and by the railroads was not classified as to preparation, but, on the other hand, the larger part of this material was given a very low value by those reporting, and it is probable that it had no preparation.

The total output of sand and gravel in 1926 was the product of more than 2,300 plants and pits. Eight States reported production from more than 100 plants each, in the following order: Illinois, New York, Michigan, Pennsylvania, Ohio, Wisconsin, California, and Indiana.

[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

26126—29——19

Sand and gravel sold or used by producers in the United States, 1917–1926

Year	Sand		Gravel (including railroad ballast)		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	40,845,506	$21,788,743	35,573,819	$13,508,189	76,419,325	$35,296,932
1918	33,119,820	24,363,769	28,704,606	13,563,310	61,824,426	37,927,079
1919	35,969,736	26,389,679	34,606,671	19,561,877	70,576,407	45,951,556
1920	43,776,142	39,198,614	38,265,246	26,462,991	82,041,388	65,661,605
1921	38,294,954	29,049,950	41,550,054	27,434,295	79,845,008	56,484,245
1922	49,694,923	35,469,920	45,172,123	29,147,744	94,867,046	64,617,664
1923	67,365,271	48,473,565	72,566,882	42,430,089	139,932,153	90,903,654
1924	75,572,010	48,844,465	80,658,053	48,168,650	156,230,063	97,013,115
1925	87,182,222	55,148,325	84,819,251	52,393,798	172,001,473	107,542,123
1926	92,114,279	55,675,988	90,986,539	55,662,713	183,100,818	111,338,701

Sand and gravel sold or used by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Short tons	Value	Short tons	Value
Sand:				
Glass	2,334,921	$3,836,085	2,274,218	$3,615,371
Molding	4,995,428	5,400,618	5,309,166	5,630,799
Building	45,287,240	26,306,463	45,327,512	24,891,475
Paving	24,876,814	13,659,228	27,476,998	14,970,906
Grinding and polishing	1,824,449	2,525,180	1,859,215	2,504,514
Fire or furnace	343,716	392,932	434,541	460,967
Engine	2,261,635	1,395,890	2,355,399	1,440,626
Filter	106,462	249,141	79,382	169,299
Other	5,151,557	1,382,788	6,997,848	1,992,031
	87,182,222	55,148,325	92,114,279	55,675,988
Gravel:				
Building	32,759,151	24,589,689	30,535,396	22,701,685
Paving	32,574,570	21,411,672	38,319,064	25,445,025
Railroad ballast	19,485,530	6,392,437	22,132,079	7,516,003
	84,819,251	52,393,798	90,986,539	55,662,713
Grand total	172,001,473	107,542,123	183,100,818	111,338,701

Sand and gravel sold or used by producers in the United States in 1925, by States and uses

State	Glass sand		Molding sand		Building sand		Paving sand		Grinding and polishing sand		Fire or furnace sand		Engine sand	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama			20,196	$20,177	507,546	$176,184	270,868	$141,075	(1)	(1)	(1)	(1)	(1)	(1)
Arizona					(1)	(1)								
Arkansas	(1)	(1)	(1)	(1)	116,230	82,604	149,300	69,231					(1)	(1)
California	(1)	(1)	35,742	64,717	3,432,386	2,240,043	2,941,322	1,591,028	(1)	(1)	(1)	(1)	(1)	(1)
Colorado			(1)	(1)	154,010	120,747	104,929	80,529					29,934	$19,101
Connecticut			2,431	3,337	316,518	228,158	36,205	19,559	(1)	(1)			(1)	(1)
Delaware			(1)	(1)	19,151	15,965	(1)	(1)					(1)	(1)
District of Columbia					(1)	(1)	(1)	(1)						
Florida					1,079,839	614,812	202,451	109,406					(1)	(1)
Georgia	(1)	(1)	(1)	(1)	427,449	168,816	119,440	73,565			(1)	(1)	21,152	5,492
Hawaii					(1)	(1)								
Idaho					(1)	(1)	13,202	2,805						
Illinois	709,029	$636,355	739,373	601,852	3,429,381	1,539,182	2,732,641	1,277,456	318,129	$678,164	(1)	(1)	171,029	79,613
Indiana	(1)	(1)	643,305	271,184	1,726,489	657,184	1,722,852	825,678	(1)	(1)	71,279	$22,039	302,460	51,429
Iowa			33,418	36,134	636,534	321,190	882,368	245,900	19,324	28,223	(1)	(1)	40,350	24,715
Kansas			(1)	(1)	1,060,997	656,092	651,863	389,221					55,023	32,236
Kentucky	(1)	(1)	38,689	49,242	610,680	552,996	189,317	141,822	(1)	(1)	(1)	(1)	20,526	19,488
Louisiana					406,574	269,058	130,366	62,364					(1)	(1)
Maine					27,805	20,100	1,309	725	3,500	7,000	(1)	(1)	(1)	(1)
Maryland	(1)	(1)			1,747,347	1,264,030	277,586	198,942					(1)	(1)
Massachusetts	(1)	(1)	48,562	54,660	1,304,313	1,207,411	291,428	205,224	9,463	13,654	(1)	(1)	69,105	46,185
Michigan	(1)	(1)	581,113	255,763	1,852,823	844,957	1,426,953	514,878	(1)	(1)			2,496	1,049
Minnesota			10,842	6,611	882,741	547,260	354,418	141,959	(1)	(1)	(1)	(1)	26,121	9,346
Mississippi					129,782	56,823	161,455	76,074					26,075	6,837
Missouri	165,200	252,271	86,680	71,651	1,147,903	806,541	1,136,791	751,287	131,123	108,234	(1)	(1)	23,541	17,397
Montana					26,581	16,472	17,472	7,071					(1)	(1)
Nebraska			(1)	(1)	686,961	244,727	146,046	53,266					28,623	8,548
Nevada					(1)	(1)	(1)	(1)					(1)	(1)
New Hampshire					18,610	19,188	(1)	(1)					(1)	(1)
New Jersey	195,770	310,796	449,578	597,284	1,991,659	920,309	1,086,052	571,152	81,119	213,057	47,145	71,391	24,920	10,816
New Mexico			(1)	(1)	13,265	12,680	(1)	(1)	(1)	(1)			13,823	7,213
New York	(1)	(1)	671,610	1,147,072	7,271,035	3,473,186	2,105,599	1,315,136	9,150	8,500	10,260	8,850	111,557	63,750
North Carolina			(1)	(1)	94,011	34,842	270,434	114,300	(1)	(1)			14,843	5,738
North Dakota					18,607	10,652	(1)	(1)						
Ohio	57,948	114,350	861,085	1,207,840	3,166,732	2,222,020	1,688,264	1,060,466	60,733	227,577	61,018	121,918	78,477	54,620
Oklahoma	(1)	(1)			412,440	241,913	373,080	210,611					53,523	36,311
Oregon					547,245	287,593	277,917	210,161	(1)	(1)			(1)	(1)
Pennsylvania	418,676	845,455	537,536	792,067	4,316,359	3,318,878	2,068,622	1,497,546	722,996	1,016,954	69,559	100,132	328,729	418,396

[1] Included under "Undistributed."

Sand and gravel sold or used by producers in the United States in 1925, by States and uses—Continued

State	Glass sand		Molding sand		Building sand		Paving sand		Grinding and polishing sand		Fire or furnace sand		Engine sand	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Rhode Island			(1)	(1)	4,903	$3,469								
South Carolina					92,947	42,451	162,171	$69,695	(1)	(1)			(1)	(1)
South Dakota					60,352	38,701	298,963	41,299					(1)	(1)
Tennessee			14,332	$11,392	601,751	535,364	254,542	202,401	42,240	$39,204	(1)	(1)	39,510	$30,041
Texas	(1)	(1)	3,133	3,723	1,001,009	543,185	428,598	219,162					62,631	24,630
Utah					102,882	45,447	(1)	(1)					(1)	(1)
Vermont			(1)	(1)	2,240	1,533	(1)	(1)	(1)	(1)			(1)	(1)
Virginia	61,532	$136,523	10,835	13,919	614,354	294,848	291,631	110,548	9,034	4,272	(1)	(1)	139,907	68,950
Washington			(1)	(1)	725,819	363,416	276,774	143,361	(1)	(1)			65,915	25,687
West Virginia	501,688	1,136,942	(1)	(1)	397,735	401,337	368,088	421,365	(1)	(1)	(1)	(1)	179,545	147,370
Wisconsin			102,990	83,587	1,993,212	708,392	507,205	174,042	(1)	(1)	(1)	(1)	53,786	20,107
Wyoming					25,491	28,952	(1)	(1)					(1)	(1)
Undistributed [2]	225,078	403,393	103,978	108,406	84,542	106,755	458,292	318,918	417,638	180,341	84,455	$68,602	278,034	160,825
	2,334,921	3,836,085	4,995,428	5,400,618	45,287,240	26,306,463	24,876,814	13,659,228	1,824,449	2,525,180	343,716	392,932	2,261,635	1,395,890
Average value		1.64		1.08		0.58		0.55		1.38		1.14		0.62

[1] Included under "Undistributed."

[2] Includes items entered as "(1)."

State	Filter sand		Other sands		Building gravel		Paving gravel		Railroad ballast gravel		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama			(1)	(1)	544,038	$398,507	567,189	$407,848	592,485	$73,610	2,683,042	$1,244,398
Arizona					(1)	(1)			(1)	(1)	(1)	(1)
Arkansas					38,480	42,400	665,799	326,720	1,032,506	474,869	2,059,893	1,078,303
California	(1)	(1)	27,874	$13,640	2,976,236	2,094,357	3,413,673	2,380,615	1,159,771	290,637	14,077,849	8,752,528
Colorado	(1)	(1)	2,716	1,113	159,488	159,430	130,596	115,874	(1)	(1)	692,395	547,944
Connecticut			(1)	(1)	142,744	150,982	(1)	(1)			1,065,132	463,807
Delaware					(1)	(1)					81,052	48,506
District of Columbia					(1)	(1)	(1)	(1)			(1)	(1)
Florida					124,728	294,757	(1)	(1)	23,130	3,600	1,515,529	1,089,215
Georgia					(1)	(1)	(1)	(1)	(1)	(1)	741,020	303,441
Hawaii											(1)	(1)
Idaho					(1)	(1)	35,623	15,169	(1)	(1)	53,180	20,142
Illinois	2,353	$7,391	(1)	(1)	2,236,895	1,152,803	2,532,938	1,246,102	1,367,952	470,089	14,954,536	8,140,090
Indiana			(1)	(1)	1,000,112	589,595	2,734,972	1,945,879	1,812,850	672,732	12,054,740	5,275,743
Iowa	6,249	7,127	(1)	(1)	381,496	342,653	939,102	426,781	307,689	89,207	3,297,785	1,546,900
Kansas			(1)	(1)	87,908	44,909	143,542	143,206	146,758	17,553	2,198,870	1,303,060
Kentucky	(1)	(1)	24,185	14,570	529,246	499,027	377,623	274,763	588,668	186,330	2,402,982	1,770,458
Louisiana			(1)	(1)	379,775	301,333	1,131,421	725,917	706,043	381,660	2,807,761	1,766,452
Maine					32,248	38,217	(1)	(1)	322,452	78,883	407,760	155,014
Maryland					857,535	1,121,856	564,063	719,903	(1)	(1)	3,619,534	3,500,130
Massachusetts	(1)	(1)	(1)	(1)	916,117	1,236,193	609,586	277,682	84,492	17,271	3,349,091	3,116,323
Michigan			(1)	(1)	2,886,661	1,907,582	2,637,270	1,635,362	757,911	238,423	10,878,375	5,684,474
Minnesota	(1)	(1)	60,983	10,982	666,058	754,281	457,554	386,323	551,519	173,543	3,015,793	2,046,250
Mississippi			41,189	12,781	359,691	301,024	817,651	376,903	995,672	290,267	2,531,515	1,120,709
Missouri			(1)	(1)	975,056	696,957	1,120,160	727,140	711,473	155,843	5,523,605	3,595,187
Montana			(1)	(1)	106,184	55,903	39,652	19,278	772,834	178,450	1,024,983	293,397
Nebraska	(1)	(1)	62,687	30,059	1,265,371	469,305	398,836	186,907	(1)	(1)	2,651,473	1,027,096
Nevada			(1)	(1)	(1)	(1)	(1)	(1)	198,441	47,452	509,998	174,527
New Hampshire					(1)	(1)	(1)	(1)	(1)	(1)	424,330	316,248
New Jersey	(1)	(1)	(1)	(1)	570,325	495,598	388,921	305,713			4,935,934	3,680,064
New Mexico	(1)	(1)			45,895	35,235	(1)	(1)	(1)	(1)	141,013	107,204
New York	13,430	14,143	(1)	(1)	3,736,274	2,777,626	971,234	896,334	56,831	36,650	14,966,616	9,750,433
North Carolina	(1)	(1)	58,176	27,812	180,000	226,978	324,726	336,928	(1)	(1)	1,108,035	886,351
North Dakota					(1)	(1)	(1)	(1)	(1)	(1)	248,084	67,155
Ohio	16,383	47,812	27,878	14,406	2,118,715	1,554,133	1,487,527	1,043,750	1,671,400	685,021	11,296,160	8,353,913
Oklahoma			(1)	(1)	274,348	156,906	396,076	225,343	50,728	21,224	1,626,758	958,657
Oregon			(1)	(1)	685,411	504,889	991,074	834,243	379,220	150,461	2,990,845	1,998,545
Pennsylvania	4,630	6,890	18,414	25,231	2,658,404	2,236,534	1,413,095	1,163,573	47,045	17,132	12,604,065	11,438,788

[1] Included under "Undistributed."

Sand and gravel sold or used by producers in the United States in 1925, by States and uses—Continued

State	Filter sand		Other sands		Building gravel		Paving gravel		Railroad ballast gravel		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Rhode Island					(1)	(1)	(1)	(1)			131, 535	$45, 157
South Carolina	(1)	(1)	(1)	(1)			(1)	(1)	(1)	(1)	511, 497	227, 996
South Dakota	(1)	(1)	(1)	(1)	14, 722	$14, 827	1, 141, 906	$449, 677	245, 373	$26, 074	1, 769, 922	576, 248
Tennessee					434, 702	394, 432	436, 009	287, 768	(1)	(1)	1, 966, 730	1, 533, 251
Texas			(1)	(1)	1, 633, 273	1, 180, 513	1, 058, 356	698, 690	1, 619, 200	734, 179	6, 093, 476	3, 478, 517
Utah			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	466, 449	189, 122
Vermont					3, 030	2, 326	9, 160	8, 250	(1)	(1)	192, 227	35, 608
Virginia			(1)	(1)	498, 363	458, 503	366, 540	319, 472	(1)	(1)	2, 170, 000	1, 491, 274
Washington			(1)	(1)	813, 462	410, 473	1, 110, 922	598, 787	1, 172, 597	213, 041	4, 197, 660	1, 763, 153
West Virginia					351, 753	333, 081	509, 027	498, 362	134, 667	87, 664	2, 475, 689	3, 083, 115
Wisconsin	(1)	(1)	(1)	(1)	1, 699, 684	794, 975	1, 559, 790	685, 811	190, 714	57, 462	6, 181, 822	2, 603, 672
Wyoming					30, 158	35, 625	16, 688	31, 725	(1)	(1)	586, 450	192, 137
Undistributed [2]	63, 417	$165, 778	4, 827, 455	$1, 232, 194	344, 565	324, 964	1, 076, 269	688, 874	1, 785, 109	523, 110	718, 283	701, 421
	106, 462	249, 141	[3] 5, 151, 557	[3] 1, 382, 788	32, 759, 151	24, 589, 689	32, 574, 570	21, 411, 672	[4] 19, 485, 530	[4] 6, 392, 437	172, 001, 473	107, 542, 123
Average value		2. 34		0. 27		0. 75		0. 66		0. 33		0. 63

[1] Included under "Undistributed."
[2] Includes items entered as "(1)."
[3] Includes 1,269,725 tons of sand, valued at $360,833, used as railroad ballast, and 3,578,046 tons of sand, valued at $716,904, used by the railroads for fills, bank widening, and stock-car bedding.
[4] Includes some gravel used by the railroads for fills and other purposes.

Sand and gravel sold or used by producers in the United States in 1926, by States and uses

State	Glass sand		Molding sand		Building sand		Paving sand		Grinding and polishing sand		Fire or furnace sand		Engine sand	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama			27,279	$26,560	388,053	$123,181	433,965	$249,061	(1)	(1)	(1)	(1)	(1)	(1)
Arizona					(1)	(1)	(1)	(1)						
Arkansas	(1)	(1)	(1)	(1)	82,012	49,442	92,602	55,083					(1)	(1)
California	2,075	$3,089	31,201	60,876	4,064,984	2,441,016	2,125,932	1,185,573	21,648	$24,043	(1)	(1)	52,319	$22,093
Colorado			(1)	(1)	178,734	135,252	88,912	66,732	(1)	(1)			31,914	19,125
Connecticut			2,359	3,182	300,282	242,829	75,029	37,586	1,532	10,250				
Delaware			18,805	27,282	13,041	8,163	40,554	20,277					(1)	(1)
District of Columbia					(1)	(1)	(1)	(1)						
Florida					1,026,818	640,325	517,917	294,427					(1)	(1)
Georgia	(1)	(1)	56,000	11,950	238,316	101,737	375,629	169,269	(1)	(1)	14,037	$4,059	24,449	6,418
Idaho					(1)	(1)								
Illinois	610,234	465,458	779,452	596,295	4,001,642	1,894,939	2,477,058	1,068,209	350,038	727,774	80,807	45,410	111,363	61,065
Indiana	(1)	(1)	758,548	356,921	1,692,039	615,565	1,318,694	584,816	(1)	(1)	(1)	(1)	210,114	53,200
Iowa			27,843	23,259	664,062	354,341	524,761	235,285	(1)	(1)	(1)	(1)	43,091	30,225
Kansas			(1)	(1)	1,145,136	660,164	633,316	379,840					142,998	72,300
Kentucky	(1)	(1)	29,790	38,047	705,848	695,877	226,882	179,118	(1)	(1)	(1)	(1)	23,553	20,922
Louisiana					387,921	228,013	206,572	114,354					(1)	(1)
Maine					(1)	(1)	(1)	(1)	(1)	(1)			(1)	(1)
Maryland	(1)	(1)	(1)	(1)	534,384	306,589	1,391,391	907,549					(1)	(1)
Massachusetts	(1)	(1)	46,110	42,941	1,310,571	1,237,918	199,733	220,813	8,841	13,941	(1)	(1)	47,648	43,157
Michigan	(1)	(1)	695,172	363,208	2,335,137	1,157,675	2,416,444	926,733	(1)	(1)			1,198	407
Minnesota			17,066	12,917	830,316	368,739	447,480	161,181	3,275	5,340	1,000	750	31,866	10,860
Mississippi					122,416	75,039	76,304	28,283					42,552	11,982
Missouri	145,383	204,067	86,035	60,362	1,022,297	595,522	1,135,697	670,516	142,354	122,947			25,422	17,526
Montana					19,501	14,791							13,817	1,500
Nebraska			(1)	(1)	569,003	244,750	81,350	34,134					(1)	(1)
Nevada			(1)	(1)	(1)	(1)	8,105	5,535						
New Hampshire					15,593	15,593	193,347	194,955						
New Jersey	185,581	308,507	468,757	633,554	1,548,018	743,659	1,005,136	534,004	88,346	241,147	50,083	68,320	69,358	28,423
New Mexico			140	100	19,972	15,042	18,867	13,477					10,404	7,548
New York	(1)	(1)	671,748	1,171,821	8,400,733	3,598,672	3,575,118	2,048,996	10,160	6,488	24,300	20,220	118,056	62,899
North Carolina					609,507	191,217	336,155	113,190					36,114	10,845
North Dakota					15,215	7,888	(1)	(1)						
Ohio	(1)	(1)	758,394	1,089,564	2,950,790	1,863,809	1,378,080	921,245	56,525	204,687	80,683	160,472	161,646	129,299
Oklahoma	35,695	61,881			349,756	203,654	256,697	154,546	(1)	(1)			30,351	19,018
Oregon					501,484	304,907	136,795	97,899	(1)	(1)			(1)	(1)
Pennsylvania	409,067	819,981	631,066	878,798	3,994,121	3,036,082	2,294,898	1,592,072	644,684	938,045	61,207	92,433	319,645	317,823

[1] Included under "Undistributed."

Sand and gravel sold or used by producers in the United States in 1926, by States and uses—Continued

State	Glass sand		Molding sand		Building sand		Paving sand		Grinding and polishing sand		Fire or furnace sand		Engine sand	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Rhode Island			(1)	(1)	(1)	(1)	34,891	$6,514						
South Carolina					81,738	$37,680	109,366	48,468					(1)	(1)
South Dakota					55,673	33,880	111,649	13,936					(1)	(1)
Tennessee			8,371	$6,522	517,723	457,924	252,508	195,613	(1)	(1)	460	$460	31,869	$27,869
Texas	6,071	$4,157	385	690	943,122	421,838	462,421	225,845					48,670	20,943
Utah					103,249	42,089	63,606	26,863					39,550	17,402
Vermont			(1)	(1)	1,696	2,035	(1)	(1)	(1)	(1)			2,250	900
Virginia	(1)	(1)	13,774	17,433	347,850	172,812	301,752	145,440	10,102	$6,154	(1)	(1)	160,257	75,302
Washington			700	2,800	511,882	280,932	438,237	208,437					43,765	13,940
West Virginia	518,128	1,134,017	21,162	43,738	391,039	392,571	300,288	298,597	(1)	(1)	(1)	(1)	227,650	194,300
Wisconsin			115,321	98,953	2,024,997	631,077	1,102,028	368,705	(1)	(1)	(1)	(1)	46,500	8,800
Wyoming					(1)	(1)	(1)	(1)						
Undistributed [2]	361,984	614,214	43,688	63,026	310,841	246,247	210,832	167,730	521,710	203,698	121,964	68,843	207,010	134,535
	2,274,218	3,615,371	5,309,166	5,630,799	45,327,512	24,891,475	27,476,998	14,970,906	1,859,215	2,504,514	434,541	460,967	2,355,399	1,440,626
Average value		1.59		1.06		0.55		0.54		1.35		1.06		0.61

[1] Included under "Undistributed."

[2] Includes items entered as "(1)."

State	Filter sand		Other sands		Building gravel		Paving gravel		Railroad ballast gravel		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama			(1)	(1)	258,149	$136,069	654,946	$634,342	649,800	$73,015	2,417,161	$1,245,210
Arizona					(1)	(1)	(1)	(1)			392,351	113,906
Arkansas			32,781	$9,834	75,250	81,212	217,929	110,567	972,248	466,820	1,529,484	847,579
California	1,415	$4,676	(1)	(1)	3,098,910	2,478,951	2,821,921	2,179,780	677,708	276,051	13,164,670	8,820,047
Colorado			(1)	(1)	139,557	132,304	229,159	176,814	(1)	(1)	764,523	590,695
Connecticut			511,587	51,150	123,021	86,722	30,730	17,850	15,016	1,500	1,059,556	451,069
Delaware	(1)	(1)			(1)	(1)					83,325	61,186
District of Columbia					(1)	(1)	(1)	(1)			561,688	583,080
Florida					170,213	404,738	99,015	134,035	(1)	(1)	1,841,009	1,483,757
Georgia			(1)	(1)			(1)	(1)	(1)	(1)	839,459	343,322
Idaho					14,255	4,414	53,267	25,710	(1)	(1)	225,345	58,985
Illinois	3,860	12,489	2,491,415	801,122	2,721,005	1,213,051	2,667,220	1,370,726	1,483,075	457,812	17,777,169	8,714,350
Indiana			1,897,298	218,121	988,709	604,844	2,220,951	1,634,682	2,754,475	1,081,621	12,009,308	5,194,448
Iowa	5,400	8,064	59,989	23,104	307,610	282,125	661,782	430,777	381,525	164,771	2,694,751	1,569,006
Kansas	(1)	(1)	(1)	(1)	83,149	38,583	283,285	278,616	(1)	(1)	2,489,343	1,491,492
Kentucky			(1)	(1)	788,114	736,029	485,289	362,265	907,378	156,828	3,214,487	2,234,586
Louisiana			(1)	(1)	530,947	456,215	964,272	702,274	554,340	265,441	2,689,840	1,784,315
Maine					139,957	125,043	11,478	13,398	256,410	42,774	491,260	220,931
Maryland	(1)	(1)	(1)	(1)	306,136	226,601	1,134,290	1,488,425	885	292	3,467,211	3,115,454
Massachusetts	(1)	(1)	16,607	10,419	760,139	1,110,866	538,661	566,893	32,222	3,476	2,969,172	3,276,787
Michigan			(1)	(1)	2,829,874	1,900,090	3,976,041	1,934,987	1,314,087	539,801	14,398,338	7,265,161
Minnesota	(1)	(1)	(1)	(1)	663,261	656,949	430,413	419,708	820,883	270,026	3,271,884	1,913,708
Mississippi			640	306	256,081	157,444	960,736	423,739	494,054	174,845	1,952,783	871,638
Missouri			79,693	56,069	845,347	601,137	786,571	511,273	343,153	140,773	4,611,952	2,980,242
Montana			73,313	26,424	35,823	17,145	29,867	32,679	763,122	220,729	935,443	313,268
Nebraska			(1)	(1)	455,365	274,108	773,219	463,495	110,776	53,451	2,134,452	1,124,764
Nevada			(1)	(1)			227,340	113,671	236,213	61,080	515,267	205,583
New Hampshire					10,225	23,007	468,282	482,602	20,651	15,482	708,098	731,639
New Jersey	32,627	88,160	45,582	63,381	346,074	328,803	519,749	435,294	96,101	103,068	4,455,412	3,576,320
New Mexico	91	98	230	36	4,269	4,701	35,847	26,288	38,757	19,515	128,577	86,805
New York	6,675	3,353	(1)	(1)	3,629,330	2,706,114	2,717,299	1,848,027	170,141	108,662	19,334,360	11,585,652
North Carolina	(1)	(1)	(1)	(1)	213,879	256,809	362,379	366,845	50,316	17,842	1,630,789	968,021
North Dakota			(1)	(1)	24,315	24,936	(1)	(1)	385,067	125,177	653,950	240,525
Ohio	(1)	(1)	27,996	16,423	1,774,593	1,136,876	1,925,979	1,170,982	2,558,335	1,036,399	11,716,926	7,840,316
Oklahoma	(1)	(1)	(1)	(1)	242,242	170,848	505,291	318,895	50,140	21,880	1,556,175	978,590
Oregon			(1)	(1)	512,959	303,012	946,982	698,806	368,041	108,732	2,568,730	1,530,794
Pennsylvania			24,236	24,348	2,737,927	2,503,653	1,698,407	1,462,606	58,695	29,377	12,873,953	11,695,218

[1] Included under "Undistributed."

Sand and gravel sold or used by producers in the United States in 1926, by States and uses—Continued

State	Filter sand		Other sands		Building gravel		Paving gravel		Railroad ballast gravel		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Rhode Island					(1)	(1)	328,288	$57,745			381,856	$90,538
South Carolina			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	513,698	231,802
South Dakota	(1)	(1)	(1)	(1)	113,249	$39,389	1,535,639	166,875	174,308	$26,190	2,013,350	286,591
Tennessee			(1)	(1)	432,946	366,644	855,512	597,338	62,076	29,092	2,254,350	1,751,336
Texas			170,040	$26,664	1,285,466	1,121,787	1,135,729	893,899	1,331,546	471,839	5,383,450	3,187,662
Utah					55,814	24,863	50,126	22,507	788,573	93,850	1,100,918	227,574
Vermont					5,740	5,828	8,007	7,189	11,000	3,000	141,554	25,535
Virginia			190,360	87,535	322,555	271,568	329,097	291,599	58,821	36,995	1,791,198	1,225,693
Washington			13,415	6,699	900,834	383,177	1,072,158	573,735	929,586	234,514	3,910,577	1,704,234
West Virginia			47,536	45,776	357,632	329,237	609,717	588,816	83,086	59,924	2,563,113	3,095,743
Wisconsin	(1)	(1)	140,984	41,482	1,817,396	775,115	1,965,255	1,059,300	731,706	227,289	7,977,261	3,264,271
Wyoming					(1)	(1)	451,002	48,670	483,689	83,610	941,292	139,273
Undistributed [2]	29,314	$52,459	1,174,146	483,138	157,079	200,628	539,937	300,301	914,074	212,460		
	79,382	169,299	[3] 6,997,848	[3] 1,992,031	30,535,396	22,701,685	38,319,064	25,445,025	[4] 22,132,079	[4] 7,516,003	183,100,818	111,338,701
Average value		2.13		0.28		0.74		0.66		0.34		0.61

[1] Included under "Undistributed."
[2] Includes items entered as "(1)."
[3] Includes 1,588,852 tons of sand, valued at $541,564, used as railroad ballast, and 4,884,398 tons of sand, valued at $962,213, used by the railroads for fills, bank widening, and stock-car bedding.
[4] Includes some gravel used by the railroads for fills and other purposes.

VALUES

There was a slight downward trend in the average value for the different classes of sand in 1926 as compared with 1925, but the value of gravel was more stable, decreasing slightly as building material only. The average value for paving gravel and for gravel used for railroad ballast and fills increased slightly.

The average value per ton for the total output of sand and gravel in 1926 was 61 cents, a decrease from 63 cents in 1925.

Average value per short ton of sand and gravel sold or used by producers in the United States, 1917–1926

[Based on amounts received for sales f. o. b. pits or nearest shipping points]

Kind	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Glass sand	$1.38	$1.94	$1.97	$2.19	$1.81	$1.62	$1.84	$1.71	$1.64	$1.59
Molding sand	.92	1.04	1.10	1.46	1.29	1.17	1.21	1.13	1.08	1.06
Building sand	.39	.50	.56	.68	.65	.60	.61	.57	.58	.55
Paving sand	.41	.54	.66	.68	.63	.61	.59	.56	.55	.54
Grinding and polishing sand	1.04	1.60	1.34	1.80	1.61	1.46	1.62	1.54	1.38	1.35
Fire or furnace sand	1.15	1.48	1.23	1.81	1.56	1.42	1.45	1.23	1.14	1.06
Engine sand	.59	.76	.77	.82	.86	.76	.76	.66	.62	.61
Filter sand	.76	1.47	1.48	1.27	1.11	1.99	1.20	2.01	2.34	2.13
Railroad ballast gravel	.17	.22	.30	.32	.33	.36	.29	.31	.33	.34
Gravel (exclusive of railroad ballast)	.46	.57	.66	.81	.75	.72	.72	.70	.70	.70
All sand and gravel	.46	.61	.65	.80	.71	.68	.65	.62	.63	.61

GLASS SAND

The production of glass sand amounted to 2,274,218 short tons, valued at $3,615,371. Although the quantity decreased about 2½ per cent as compared with 1925, it exceeded the production of any other year. There was a decrease of 6 per cent in total value as compared with 1925. Among the larger producing States, Illinois led in quantity with West Virginia, Pennsylvania, New Jersey, and Missouri following in order, the output ranging from 610,234 tons in Illinois to 145,383 tons in Missouri. West Virginia was first in total value of glass sand, its output being valued at $1,134,017, and Pennsylvania, Illinois, New Jersey, and Missouri followed. There were 18 States reporting glass sand in 1926.

The average per ton for the total output of glass sand decreased from $1.64 in 1925 to $1.59 in 1926. The average value per ton for West Virginia was $2.19 and for Illinois it was 76 cents. There were exceptional State averages for glass sand lower than that of Illinois and higher than that of West Virginia; otherwise the range of average value for State production was between these two.

Glass sand sold or used by producers in the United States, 1917–1926

Year	Short tons	Value		Year	Short tons	Value	
		Total	Average			Total	Average
1917	1,[illegible]	$2,685,014	$1.38	1922	1,768,549	$2,866,366	$1.62
1918	2,[illegible]	4,209,728	1.94	1923	2,034,958	3,751,778	1.84
1919	1,[illegible]	3,593,371	1.97	1924	2,169,899	3,718,973	1.71
1920	2,[illegible]	4,748,690	2.19	1925	2,334,921	3,836,085	1.64
1921	1,[illegible]	2,314,314	1.81	1926	2,274,218	3,615,371	1.59

MOLDING SAND

The production of molding sand increased 6 per cent in quantity and 4 per cent in total value in 1926. The States leading in quantity were Illinois, Indiana, Ohio, Michigan, New York, Pennsylvania, and New Jersey, the output ranging from 779,452 tons in Illinois to 468,757 tons in New Jersey; and the States leading in total value were New York, Ohio, Pennsylvania, New Jersey, Illinois, Michigan, and Indiana, the value ranging from $1,171,821 in New York to $356,921 in Indiana.

The average value per ton for the total output of molding sand was $1.06 in 1926 as compared with $1.08 in 1925. The average value per ton for Illinois, the leading producer, was 77 cents, and for New York, which led in value of output, $1.74. State averages were commonly between 21 cents and $2 per ton, with exceptional averages lower and higher than these. Molding sand was reported from 32 States.

Molding sand sold or used by producers in the United States, 1917–1926

Year	Short tons	Value		Year	Short tons	Value	
		Total	Average			Total	Average
1917	4,660,968	$4,303,809	$0.92	1922	3,839,116	$4,478,405	$1.17
1918	4,910,178	5,121,865	1.04	1923	5,559,644	6,730,417	1.21
1919	3,774,612	4,153,990	1.10	1924	4,403,893	4,995,268	1.13
1920	5,128,075	7,504,759	1.46	1925	4,995,428	5,400,618	1.08
1921	1,906,977	2,451,966	1.29	1926	5,309,166	5,630,799	1.06

IMPORTS

Imports of sand and gravel in 1926 amounted to 947,579 short tons, valued at $341,911, an increase of 77 per cent in quantity and 46 per cent in value over 1925. That brought in from Canada, largely as ballast, increased in 1926 and constituted 89 per cent of the total quantity and 80 per cent of the total value of imports.

The values given for imports are those upon which the import tax in this country is levied and represent the foreign market value (or the export value, if higher) plus cost of containers and all expenses incident to placing merchandise ready for shipment to the United States, including the export tax, if any.

Sand and gravel imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	(1)	$142,586	1922	451,943	$238,386
1918	(1)	91,465	1923	477,762	259,820
1919	597,481	126,586	1924	701,410	280,206
1920	1,226,684	912,282	1925	534,555	233,422
1921	906,905	771,734	1926	947,579	341,911

[1] Quantities not recorded prior to July, 1918. During last 6 months of 1918 the imports were 284,036 tons, valued at $46,910.

Sand and gravel imported for consumption in the United States, 1924–1926, by classes

Class	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Glass sand	6,479	$1,961	4,186	$2,262	8,817	$9,091
Other sand	246,345	123,099	305,769	141,655	699,286	242,594
Gravel	448,586	155,146	224,600	89,505	239,476	90,226
	701,410	280,206	534,555	233,422	947,579	341,911

Sand and gravel imported into the United States, 1924–1926, by countries

[General imports]

Country	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
North America:						
Canada	622,970	$221,627	463,930	$174,726	846,758	$272,729
Cuba			193	204	728	986
Mexico	541	338	571	390	11,284	2,450
South America: Brazil			441	7,092		
Europe:						
Belgium	76,251	42,890	68,290	38,902	85,164	49,814
Denmark			84	1,046		
France	660	4,457	696	5,427	1,096	7,553
Germany	36	726	6	116	4	61
Italy	17	775	11	20		
Netherlands	224	1,199	136	1,070	296	3,537
Norway	1	3				
Spain					6	220
Sweden	4	15			273	244
United Kingdom	482	3,721	28	1,269	1,959	4,114
Asia:						
Hong Kong	(1)	3				
India (British)	224	4,452	169	3,135	6	152
Japan			(1)	25	2	51
	701,410	280,206	534,555	233,422	947,579	341,911

[1] Less than 1 ton.

EXPORTS

Exports of sand and gravel in 1926 amounted to 424,374 short tons, valued at $610,023, a slight decrease in quantity but an increase of 23 per cent in value from 1925. Canada received 92 per cent of the exports and Mexico 5 per cent.

Sand and gravel exported from the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	(1)	$494,251	1922	356,520	$400,199
1918	(1)	619,414	1923	551,233	598,633
1919	(1)	382,070	1924	314,140	467,062
1920	(1)	669,945	1925	425,612	496,050
1921	(1)	379,982	1926	424,374	610,023

[1] Quantity not recorded prior to 1922.

SULPHUR AND PYRITES

By C. E. Julihn and H. M. Meyer[1]

INTRODUCTION

The sulphur-producing industry is one of the most interesting in that its history in America exhibits most strikingly the vicissitudes that mark mineral industries in general.

In the past 50 years the consumption of sulphur, including sulphur in pyrites, in the United States has increased from less than 100,000 tons per annum to an average during the past 10 years of about 1,340,000 tons per annum. At the beginning of the period the principal source of sulphur consumed in the United States was brimstone imported from Sicily. There was also some utilization of domestic pyrites, but little pyrites was imported. For some years thereafter there was a steady increase in recognition of pyrites as a satisfactory substitute for brimstone in the manufacture of sulphuric acid, especially acid used for making phosphate fertilizer. The rapid increase in consumption of sulphur was met by increase in the domestic production of pyrites and in imports of pyrites rather than by increased imports of brimstone, until at length the larger proportion of our sulphur consumption was supplied by pyrites. Thus, for the 13-year period 1891 to 1903, inclusive, the average consumption of sulphur was about 341,000 tons per annum, of which 141,000 tons were supplied by imported brimstone and 4,500 tons by domestic brimstone, while 195,000 tons were derived from 413,000 tons of pyrites, including 259,000 tons imported and 154,000 tons produced in the United States.

The next 13-year period, 1904 to 1916, inclusive, was characterized by a steady increase in the domestic production of pyrites from the stated yearly average of 154,000 tons to an average of 296,000 tons; by an increase of pyrites imports from the stated average of 259,000 tons to an average of almost 800,000 tons; and by a sudden increase of domestic brimstone production from the stated 4,500 tons to an average of 365,000 tons per annum. This increase in domestic production of brimstone was accompanied by a drop in average imports from 141,000 tons to about 40,000 tons, and these imports were more than offset by average yearly exports of 46,000 tons, no exports having been made in the previous period. In effect, then, the previous large imports of sulphur were canceled and there was a net annual outflow of about 6,000 tons. Deducting this annual outflow and a proper allowance for a total of more than a million tons of brimstone accumulated in stocks during the period from the total sulphur made available in brimstone and pyrites indicates an average annual consumption of about 794,000 tons of sulphur, exclusive of any utilization of by-product smelter fumes. About 517,000 tons of this total sulphur consumed was derived from pyrites.

[1] Statistics on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

The 10-year period, 1917 to 1926, inclusive, witnessed the dramatic advance of American brimstone to a position of dominance. The average annual production for the decade was 1,520,000 tons, whereas the production in the preceding decade averaged 365,000 tons. Imports of foreign sulphur were negligible as they averaged less than 300 tons yearly. Exports increased to an average of about 392,000 tons. Pyrites production dropped moderately from a yearly average of 296,000 tons to 268,000 tons but amounted to less than 170,000 tons in 1926, while pyrites imports dropped from an average of nearly 800,000 tons to an average of 383,000 tons. Domestic consumption increased at the same time from an average of 794,000 tons to an average of about 1,340,000 tons (exclusive of by-product recovery).

This brief résumé of the course of events will serve as a setting for the situation in 1926, shown on subsequent pages. It exemplifies the enormous expansion of mineral consumption in the United States, the rise of a substitute (pyrites) to an important competitive position and its subsequent recession in importance but with sufficient resistance to indicate its continued vitality as a potential future competitor (of brimstone); the loss of an important foreign market by one country (Italy) at a time when this appeared secure; the final transfer of long-existing dominance in world markets from one country to another; and the profound effect on all these events produced by an important advance in mineral technology (the Frasch or hot-water well system of mining sulphur). These are some of the things illustrated by the history of sulphur in America that reflect the vicissitudes of all mineral industries, though the changes are usually less sudden and less decisive.

SULPHUR

DOMESTIC PRODUCTION

Sulphur production of the United States in 1926 was 1,890,027 long tons, and shipments from the mines were 2,072,657 tons, so that mine stocks were reduced by 182,630 tons. The production of 1926 is exceeded by that of 1923 only, and the tonnage shipped exceeds that of any previous year, as does also the value of both production and shipments; the value of production in 1926 was about $34,000,000 and the value of shipments $37,300,000. The estimated average value at the mines for the year was $18 per long ton, that for the first three months being about $16.50 and that for the last nine months about $18.50.

The following table shows the progress of American sulphur production from 1907 to 1926.

Sulphur produced and shipped in the United States, 1907–1926

Year	Produced (long tons)	Shipped		Year	Produced (long tons)	Shipped	
		Long tons	Approximate value			Long tons	Approximate value
1907	188,878	271,859	$4,771,000	1917	1,134,412	1,120,378	$23,987,000
1908	364,444	206,473	3,727,000	1918	1,353,525	1,266,709	27,868,000
1909	273,983	258,203	4,782,000	1919	1,190,575	678,257	10,252,000
1910	247,060	250,919	4,522,000	1920	1,255,249	1,517,625	30,000,000
1911	205,066	253,795	4,573,000	1921	1,879,150	954,344	17,000,000
1912	787,735	305,390	5,289,000	1922	1,830,942	1,343,624	22,000,000
1913	491,080	319,333	5,617,000	1923	2,036,097	1,618,841	26,000,000
1914	417,690	341,985	6,214,000	1924	1,220,561	1,537,345	25,000,000
1915	520,582	293,803	4,959,000	1925	1,409,262	1,858,003	29,000,000
1916	649,683	766,835	12,246,000	1926	1,890,027	2,072,657	37,300,000

More than 99.9 per cent of the domestic production of sulphur in 1926 was made by the two large companies mining sulphur "domes" in Texas by the hot-water well system—the Texas-Gulf Sulphur Co., at Matagorda, and the Freeport Sulphur Co. operating upon the Bryan Mound and the Hoskins Mound, both near Brazoria. The total shipments, however, include a large quantity shipped by the Union Sulphur Co. from its stocks in Louisiana, still remaining after the suspension of mining operations in 1924.

A small production was also made by a mine in Nevada, and another mine in that State distributed crude sulphur ore for experimental purposes. A car of sulphur-bearing material was shipped as fertilizer from Culberson County, Tex. A small shipment of sulphur was made from stocks at a mine in Beaver County, Utah.

IMPORTS AND EXPORTS

With American production of sulphur constituting something like 85 per cent of the world's production, sulphur imports into this country have become only casual and are negligible. In 1926 they totaled 48 long tons classified as "sulphur and sulphur ore," the value of which was $1,052.

Exports of crude American sulphur in 1926, amounting to 576,966 long tons, exceeded those of any previous year except 1925, when 629,401 tons were exported; this drop of 52,435 tons, or 8.3 per cent, was perhaps incident to the increased price of sulphur. The total value of crude sulphur exported in 1926 was $10,918,394 as against $11,000,235 in 1925.

The effect of the development of American production upon American foreign trade is shown in the record of imports. The peak of imports was reached in 1903 (189,000 tons). Since then imports have dwindled to almost nothing. The first recorded export of American sulphur was a cargo of 3,000 tons from Louisiana in 1904. Now the annual rate of export is about two hundred times that figure.

Crude sulphur imported into and exported from the United States, 1907–1926

Year	Imports for consumption		Exports		Year	Imports for consumption		Exports	
	Long tons	Value	Long tons	Value		Long tons	Value	Long tons	Value
1907	20,399	$355,944	35,925	$734,749	1917	973	$20,176	152,736	$3,500,819
1908	19,620	318,577	27,894	561,534	1918	55	1,692	131,092	3,626,638
1909	28,800	492,962	37,142	736,928	1919	77	1,997	224,712	6,325,552
1910	28,656	496,073	30,742	552,941	1920	44	1,722	477,450	8,994,350
1911	24,200	434,796	28,103	545,420	1921	4	226	285,762	4,324,768
1912	26,885	494,778	57,736	1,076,414	1922	[1] 167	6,453	485,664	7,095,628
1913	15,122	286,209	89,221	1,599,761	1923	[2] 465	21,535	472,525	7,105,260
1914	23,610	398,984	98,163	1,807,324	1924	[2] 1,005	40,293	482,114	7,792,854
1915	24,647	405,990	37,312	724,679	1925	[2] 100	4,411	629,401	11,000,235
1916	21,289	358,416	128,755	2,505,857	1926	[2] 48	1,052	576,966	10,918,394

[1] Composed of 130 tons of "crude sulphur," imported Jan. 1 to Sept. 21, and 37 tons of "sulphur and sulphur ore," imported Sept. 22 to Dec. 31.
[2] Classified as "sulphur and sulphur ore."

In addition to the brimstone or crude sulphur, 12,002,105 pounds, or nearly 5,400 long tons, of refined, sublimed, or flowers of sulphur,

valued at $236,146, were exported in 1926; the average value was 19.7 cents per pound, or $44 per long ton. Similar exports in 1925 were only 6,381,791 pounds, valued at $153,546, or about half the quantity recorded in 1926.

Canada was the largest importer of our sulphur in 1926, taking 159,416 tons of brimstone (27.6 per cent of the total exported) and also nearly one-third of the refined sulphur; Germany was next in order, with 108,479 tons of brimstone (18.8 per cent of the total); France and Australia followed, with 91,735 tons and 66,507 tons of brimstone, respectively, or together 27.4 per cent of the total, and also 1,122,000 pounds and 1,097,080 pounds of refined sulphur, respectively. These four customers received nearly three-fourths of the total exports of brimstone.

The following table of exports for 1925 and 1926 indicates considerably increased demand for brimstone from Canada, Mexico, Argentina, and Portugal but decreased demand from Belgium, France, Germany, the Netherlands, and British South Africa.

Sulphur exported from the United States, 1925–26, by destinations

Destination	Sulphur or brimstone		Refined, sublimed, and flowers of	
	Long tons	Value	Pounds	Value
1925				
North America:				
Canada	125,681	$2,019,205	2,795,209	$70,058
Central America	21	978	257,947	7,116
Mexico	13,844	227,880	1,293,410	25,108
Newfoundland and Labrador	3,384	50,294	1,174	105
West Indies and Bermuda	2,541	36,991	89,948	3,222
	145,471	2,335,348	4,437,688	105,609
South America:				
Argentina	8,200	131,500	39,600	2,340
Brazil	3,222	48,966	34,894	739
Colombia	4,067	65,757	63,253	2,830
Uruguay	150	3,600	334,000	4,400
Other	962	30,492	194,062	4,332
	16,601	280,315	665,809	14,641
Europe:				
Belgium	11,608	220,975	----------	----------
France	110,684	1,996,157	----------	----------
Germany	136,972	2,638,285	----------	----------
Netherlands	40,909	781,217	----------	----------
Spain	8,345	145,592	----------	----------
United Kingdom	30,398	557,322	226,913	4,177
Other	2,114	36,452	640	96
	341,030	6,376,000	227,553	4,273
Asia	2,752	44,105	151,442	2,801
Africa:				
Algeria and Tunisia	7,700	138,700	----------	----------
British—				
East	7,700	138,600	----------	----------
South	15,100	237,500	50,344	1,096
Portuguese East	1,500	25,500	----------	----------
	32,000	540,300	50,344	1,096

Sulphur exported from the United States, 1925–26, by destinations—Continued

Destination	Sulphur or brimstone		Refined, sublimed, and flowers of	
	Long tons	Value	Pounds	Value
1925—Continued				
Oceania:				
Australia	71,530	$1,124,258	621,533	$19,585
New Zealand	20,017	299,909	227,310	5,522
Other			112	19
	91,547	1,424,167	848,955	25,126
	629,401	11,000,235	6,381,791	153,546
1926				
North America:				
Canada	159,416	2,960,844	3,574,691	78,484
Central America	134	4,241	223,889	6,606
Mexico	18,842	318,219	1,276,029	25,564
Newfoundland and Labrador	6,107	115,326	1,605	58
West Indies and Bermuda	2,566	38,144	149,024	4,494
	187,065	3,436,774	5,225,238	115,206
South America:				
Argentina	13,555	249,200	125,150	2,378
Brazil	2,109	52,981	780,434	13,323
Colombia	5	282	60,653	3,444
Uruguay			1,008,360	15,087
Other	8	255	72,040	1,699
	15,677	302,718	2,046,637	35,931
Europe:				
Belgium			43,950	495
Finland			39,520	594
France	91,735	1,826,430	1,122,000	17,281
Germany	108,479	2,160,077		
Netherlands	20,158	411,773		
Portugal	17,600	303,600		
Spain	6,227	126,596	675,627	11,821
United Kingdom	27,340	518,972	898,357	14,029
	271,539	5,347,448	2,779,354	44,220
Asia	2,751	55,045	546,518	9,393
Africa:				
Algeria and Tunisia	6,804	133,781		
British South	5	153	51,508	838
	6,809	133,934	51,508	838
Oceania:				
Australia	66,507	1,178,132	1,097,080	24,626
New Zealand	26,618	464,343	255,770	5,932
	93,125	1,642,475	1,352,850	30,558
	576,966	10,918,394	12,002,105	236,146

FOREIGN PRODUCTION

Sicily, the other chief producer of sulphur, is reported to have produced 208,741 metric tons in 1926, less than 10 per cent of the world's production.

The shipments of sulphur from Sicily during the fiscal years ended July 31, 1925, and July 31, 1926, by countries of destination, are

given as follows in a report dated January 5, 1927, by Consul Edward I. Nathan, Palermo, Italy:

Sulphur shipped from Sicily during the fiscal years ended July 31, 1925–26, by destinations, in metric tons

	1925	1926		1925	1926
To foreign countries:			To foreign countries—Contd.		
Africa—			Portugal	13,872	2,245
Algeria, Egypt, Tunisia	5,575	3,001	Rumania	864	1,692
British South	1,262	11,863	Russia	5,206	2,394
Australia	13,178	464	Spain	2,950	2,612
Austria	11,876	13,097	Sweden	11,268	9,547
Belgium	1,817	346	Turkey	4,409	3,999
Czechoslovakia	1,074	529	United Kingdom	69,667	57,212
Finland	3,933	3,082	Yugoslavia	1,311	2,764
France	24,277	17,490	Other countries	14,173	6,966
Germany	11,372	6,924		237,262	170,171
Greece	16,584	7,955	To Italy and Sicily	54,960	51,215
India, British	8,686	5,003		292,222	221,386
Indies, Netherland East	9,422	7,874			
Netherlands	1,385	615			
Norway	3,101	2,497			

Although the fiscal year makes difficult a direct evaluation of the situation with respect to the calendar year the tendency is apparent, and it is understood that exports have been made possible only through substantial reduction of stocks, which are reported to be lower than for many years past, one estimate indicating as little as 60,000 tons.

Japan produced 47,775 tons of sulphur (about 2 per cent of the world's production) in 1926, chiefly from Hokkaido. This production is said to be nearly balanced with Japanese consumption, although there are some exports to China, Australia, etc. The Okushiri mine in Hokkaido, which has been producing 15,000 tons per annum, has closed down, but other mines have increased their production.[2]

To Spain is attributed a production of 64,867 metric tons of sulphur rock, the sulphur content of which averaged 18 per cent. This was presumably the source of about 9,500 tons of the 19,454 metric tons of sulphur reported as manufactured in Spain. This is something less than 1 per cent of the world's production.

Some production was made by Chile, probably somewhat in excess of 5,000 tons.

Several other countries produce small amounts of sulphur, so that the world's production is estimated at not less than 2,180,000 or more than 2,200,000 long tons.

PYRITES

PRODUCTION

Production of pyrites in the United States in 1926 was 166,559 long tons, valued at $616,668. Much of this tonnage came from a single mine in Shasta County, Calif., and was consumed on the Pacific coast. This mine, another in California, and one in Virginia accounted for 95 per cent of the total production; the balance came from two operations—one each in New York and Ohio.

Of the total production less than 40 per cent was lump ore and the remainder was fines. It is understood that a considerable fraction

[2] Commerce Reports, Feb. 14, 1927.

of domestic production was low grade, and that much of it was utilized by producers themselves.

The total value of pyrites produced in the United States during 1926 was less than for any year since 1899.

Pyrites produced in the United States, 1907–1926

Year	Long tons	Value	Year	Long tons	Value
1907	247,387	$794,949	1917	482,662	$2,593,035
1908	222,598	857,113	1918	464,494	2,644,515
1909	247,070	1,028,157	1919	420,647	2,558,172
1910	241,612	977,978	1920	310,777	1,596,961
1911	301,458	1,164,871	1921	157,118	711,432
1912	350,928	1,334,259	1922	169,043	671,241
1913	341,338	1,286,084	1923	181,628	661,000
1914	336,662	1,283,346	1924	160,096	645,262
1915	394,124	1,674,933	1925	170,081	650,448
1916	439,132	2,038,002	1926	166,559	616,668

IMPORTS

Imports of pyrites in 1926 amounted to 366,151 long tons, valued at $856,981, an increase of 32 per cent in quantity but only 11 per cent in value over the 276,385 tons, valued at $773,925, imported in 1925. The average reported value in 1926 was $2.34 a ton as against $2.80 in 1925. Of the imports in 1926 365,105 tons, valued at $854,790, came from Spain, and 1,046 tons, valued at $2,191, from Canada.

Following an eight-year period (1910–1917) in which pyrites imports had averaged nearly a million tons per annum, the imports were reduced in 1918 to about half of their former amount as a result of war conditions. The substitution of brimstone for many uses caused further diminution in subsequent years until 1926 when by sudden reversal of trend imports increased to nearly equal those of 1919. In that year the average reported value was $5.60, more than double the 1926 value. It would appear that the present volume of imports is made possible by the low price of foreign pyrites.

The rise of imports from 1907 to 1916 and their subsequent fall are shown by the following table:

Sulphur ore as pyrites, containing more than 25 per cent of sulphur, imported for consumption in the United States, 1907–1926

Year	Long tons	Value	Year	Long tons	Value
1907	627,985	$2,581,787	1917	967,340	$5,981,457
1908	668,117	2,624,339	1918	496,792	2,741,676
1909	688,843	2,428,580	1919	388,973	2,176,565
1910	803,551	2,748,647	1920	332,606	1,660,832
1911	1,006,310	3,788,803	1921	216,229	818,852
1912	970,785	3,841,683	1922	279,445	1,199,076
1913	850,592	3,611,137	1923	263,695	1,254,389
1914	1,026,617	4,797,326	1924	246,737	598,544
1915	964,634	4,817,977	1925	276,385	773,925
1916	1,244,662	6,728,318	1926	366,151	856,981

Exports of "pyrites or other sulphur ore" have not been separately shown since 1922, when they amounted to 323 long tons, valued at $4,325.

CEMENT

By B. W. Bagley

GENERAL REVIEW

The final figures of production and shipments of Portland cement in 1926, compiled from the annual returns of the producers, confirm the estimates summarized from the monthly reports of the producers and published by the Bureau of Mines early in January, 1927. The production of Portland cement in 1926—164,530,170 barrels—was the greatest quantity manufactured in any year, exceeding that in 1925, the next highest year in production, by 2 per cent.

In 1926 there were shipped from the mills 162,187,090 barrels of Portland cement, valued at $277,965,473, an increase of 3 per cent in quantity and a decrease of 0.2 per cent in gross value. The average factory value per barrel, in bulk, in 1926 was $1.71, a decrease of 6 cents per barrel as compared with 1925.

The stocks of finished Portland cement at the mills at the end of 1926—20,679,253 barrels—were the greatest at the end of any year during which official records of stocks have been kept and were about 13 per cent higher than on December 31, 1925. At the end of December, 1926, there were also on hand at the mills 7,799,000 barrels of clinker or unground cement, as compared with 6,469,000 barrels at the end of 1925, an increase of 20.6 per cent.

In the opening months of 1926 and up to May the production of Portland cement was a little lower than in the early months of 1925 and, except the month of January, this was also true of the shipments from the mills. Beginning with May both production and shipments showed increases each month over the preceding year until December, when shipments showed a decrease.

In July production of Portland cement reached a new level—17,134,000 barrels—which was not exceeded in any later month, while the shipments from the mills reached their highest point in June—19,134,000 barrels. The production of masonry, natural, and puzzolan cements also increased in 1926, exceeding that of 1925 by nearly 22 per cent.

The following table summarizes the value of buildings shown by permits issued during 1923 to 1926 in 181 cities, representing all parts of the United States, and shows the general trend of building construction during these years. The grand totals increased successively from 1923 to 1925, although they showed a decrease of 6 per cent in

1926 from 1925 in which all the districts except New York and northern New Jersey participated:

Value of buildings shown by permits issued in 181 cities in the United States, 1923–1926 [1]

Group of cities	1923	1924	1925	1926	Increase or decrease, 1926 from 1925 (per cent)
New England	$153,820,000	$183,099,000	$225,757,000	$172,375,000	−24
New York and northern New Jersey	983,772,000	1,062,275,000	1,267,673,000	1,307,255,000	+3
Eastern Pennsylvania, southern New Jersey, Maryland, Delaware, District of Columbia, and Virginia	303,717,000	330,909,000	381,705,000	314,048,000	−18
Western Pennsylvania, West Virginia, Ohio, and Kentucky	243,146,000	255,218,000	299,761,000	267,753,000	−11
Illinois, Indiana, Iowa, Wisconsin, Michigan, Missouri, Kansas, Nebraska, and Oklahoma	734,100,000	719,085,000	846,438,000	817,196,000	−3
Minnesota, North Dakota, and South Dakota	80,562,000	55,912,000	65,026,000	47,751,000	−27
North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, and Louisiana	145,621,000	168,561,000	226,611,000	220,176,000	−3
Arizona and Texas	64,974,000	73,468,000	91,050,000	80,458,000	−12
Colorado, Utah, Montana, and Idaho	31,627,000	34,073,000	36,171,000	22,993,000	−36
California, Washington, and Oregon	408,351,000	383,059,000	405,258,000	348,704,000	−14
	3,149,690,000	3,265,659,000	3,845,450,000	3,598,709,000	−6

[1] From Bulletin of Portland Cement Association, showing values tabulated in detail by cities, based on Bradstreet's and F. W. Dodge Corporation building statistics.

The following table summarizes the value of contracts awarded in eastern and central States for buildings of all classes and for engineering construction of all other kinds, including public works:

Value of contracts awarded for building and all other construction work in eastern and central States, 1923–1926 [1]

Group of States	1923	1924	1925	1926	Increase or decrease, 1926 from 1925 (per cent)
New England	$332,857,000	$352,195,000	$477,181,000	$441,183,000	−8
New York and northern New Jersey	1,068,935,000	1,326,896,000	1,601,257,000	1,775,060,000	+11
Eastern Pennsylvania, southern New Jersey, Maryland, Delaware, District of Columbia, and Virginia	374,182,000	477,746,000	552,318,000	658,414,000	+19
Western Pennsylvania, West Virginia, Ohio, and Kentucky	593,994,000	578,365,000	828,642,000	741,368,000	−11
Illinois, Indiana, Iowa, Wisconsin, Michigan, Missouri, Kansas, Nebraska, and Oklahoma	1,006,422,000	1,049,586,000	1,487,310,000	1,669,043,000	+12
Minnesota, North and South Dakota, and northern Michigan	127,336,000	88,264,000	95,229,000	102,118,000	+7
North and South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, and Louisiana	486,757,000	606,255,000	779,132,000	730,317,000	−6
	3,990,483,000	4,479,307,000	5,821,069,000	6,117,503,000	+5

[1] From Bulletin of Portland Cement Association, based on compilations by F. W. Dodge Corporation.

CHIEF HYDRAULIC CEMENTS

The accompanying table gives statistics of output of Portland and other (masonry, natural, and puzzolan) hydraulic cements from 1917 to 1926. The quantity of these cements produced in the United States increased nearly 2 per cent in 1926 as compared with 1925, while the shipments from the mills in 1926 increased over 3 per cent in quantity and decreased 0.1 per cent in value as compared with 1925.

Statistics of output of alumina cement, representing the operations of only one manufacturer in the United States, are not included in this or other tables of this report. No production of this type of cement was reported for 1923, but it was marketed in 1924 and 1925 and to still further extent in 1926. Indications are that its use will increase steadily.

Principal hydraulic cements produced and shipped in the United States, 1917–1926

Year	Production						Shipments					
	Portland cement		Masonry, natural, and puzzolan cements		Total		Portland cement		Masonry, natural, and puzzolan cements		Total	
	Number of active plants	Barrels	Number of active plants	Barrels	Number of active plants	Barrels	Barrels	Value	Barrels	Value	Barrels	Value
1917	117	92, 814, 202	10	(1)	127	(1)	90, 703, 474	$122, 775, 088	639, 456	$435, 370	91, 342, 930	$123, 210, 458
1918	114	71, 081, 663	9	(1)	123	(1)	70, 915, 508	113, 316, 275	432, 966	401, 341	71, 348, 474	113, 717, 616
1919	111	80, 777, 935	8	(1)	119	(1)	85, 612, 899	146, 734, 844	528, 589	583, 554	86, 141, 488	147, 318, 398
1920	117	100, 023, 245	9	(1)	126	(1)	96, 311, 719	194, 439, 025	767, 481	1, 150, 890	97, 079, 200	195, 589, 915
1921	115	98, 842, 049	9	(1)	124	(1)	95, 507, 147	180, 778, 415	539, 402	897, 025	96, 046, 549	181, 675, 440
1922	118	114, 789, 984	9	(1)	127	(1)	117, 701, 216	207. 170, 430	889, 428	1, 293, 598	118, 590, 644	208, 464, 028
1923	126	137, 460, 238	10	(1)	136	(1)	135, 912, 118	257, 684, 424	1, 271, 674	1, 947, 352	137, 183, 792	259, 631, 776
1924	132	149, 358, 109	10	(1)	142	(1)	146, 047, 549	264, 046, 708	1, 418, 461	2, 006, 559	147, 466, 010	266, 053, 267
1925	138	161, 658, 901	10	1, 729, 343	148	163, 388, 244	157, 295, 212	278, 524, 108	1, 751, 725	2, 551, 583	159, 046, 937	281, 075, 691
1926	140	164, 530, 170	11	2, 104, 891	151	166, 635, 061	162, 187, 090	277, 965, 473	2, 031, 851	2, 820, 110	164, 218, 941	280, 785, 583

[1] Figures for production of masonry, natural, and puzzolan cements not available.

HYDRAULIC CEMENT PLANTS

Many requests for general information concerning the location of the plants manufacturing hydraulic cement have been received by the Bureau of Mines. To supply this information, the following list has been prepared (as of Dec. 31, 1927); the arrangement is alphabetical by States and location of plants.

Portland cement

Alabama:
- Leeds—Atlas Portland Cement Co., New York, N. Y.
- North Birmingham—Alabama Portland Cement Co., Birmingham.
  Lehigh Portland Cement Co., Allentown, Pa.
- Powderly—Phoenix Portland Cement Corporation, Birmingham. (Not completed or productive until 1927.)
- Ragland—National Cement Co., Birmingham.
- Spocari—Warrior Cement Corporation, Chattanooga, Tenn.

California:
- Cement—Pacific Portland Cement Co., Consolidated, San Francisco.
- Colton—California Portland Cement Co., Los Angeles.
- Cowell—Cowell Portland Cement Co., Cowell.
- Davenport—Santa Cruz Portland Cement Co., San Francisco.
- Merced—Yosemite Portland Cement Corporation, Merced. (Not completed or productive until 1927.)
- Monolith—Monolith Portland Cement Co., Los Angeles.
- Oro Grande—Golden State Portland Cement Co., Los Angeles.
- Redwood City—Pacific Portland Cement Co., Consolidated, San Francisco.
- Riverside—Riverside Portland Cement Co., Los Angeles.
- San Andreas—Calaveras Cement Co., San Francisco.
- San Juan Bautista—Pacific Portland Cement Co., Consolidated, San Francisco.
- Victorville—Southwestern Portland Cement Co., Los Angeles.

Colorado:
- Boettcher—Colorado Portland Cement Co., Denver.
- Concrete—United States Portland Cement Co., Denver.
- Portland—Colorado Portland Cement Co., Denver.

Florida: Hookers Point (near Tampa)—Florida Portland Cement Co., Tampa. (Not completed or productive until 1927.)

Georgia:
- Clinchfield—Pennsylvania-Dixie Cement Corporation, Chattanooga, Tenn.
- Portland—Georgia Cement & Stone Co., Birmingham, Ala.
- Rockmart—Southern States Portland Cement Co., Rockmart.

Illinois:
- Dixon—Sandusky Cement Co., Cleveland, Ohio.
- La Salle—Alpha Portland Cement Co., Easton, Pa.
  Marquette Cement Manufacturing Co., Chicago.
- Oglesby—Lehigh Portland Cement Co., Allentown, Pa.

Indiana:
- Buffington—Universal Portland Cement Co., Chicago, Ill.
- Greencastle—Indiana Portland Cement Co., Indianapolis.
- Mitchell—Lehigh Portland Cement Co., Allentown, Pa.
- Speed—Louisville Cement Co., Louisville, Ky. (Also masonry and natural cements.)
- Stroh—Wabash Portland Cement Co., Detroit, Mich.

Iowa:
- Davenport—Dewey Portland Cement Co., Kansas City, Mo. (Not completed or productive until 1927.)
- Des Moines—Hawkeye Portland Cement Co., Des Moines.
- Gilmore City—Northwestern States Portland Cement Co., Mason City.
- Mason City—Lehigh Portland Cement Co., Allentown, Pa.
  Northwestern States Portland Cement Co., Mason City.
- Valley Junction—Pyramid Portland Cement Co., Des Moines.

Kansas:
- Bonner Springs—Kansas Portland Cement Co., Kansas City, Mo.
- Chanute—Ash Grove Lime & Portland Cement Co., Kansas City, Mo.
- Fredonia—Consolidated Cement Corporation, Kansas City, Mo.
- Humboldt—Monarch Cement Co., Humboldt.
- Independence—Atlas Portland Cement Co. of Kansas, New York, N. Y.

Kansas—Continued.
Iola—Lehigh Portland Cement Co., Allentown, Pa.
Mildred—Consolidated Cement Corporation, Kansas City, Mo.
Kentucky: Kosmosdale—Kosmos Portland Cement Co., Louisville. (Also masonry and natural cements.)
Louisiana: New Orleans—Louisiana Portland Cement Co., New Orleans. (Not completed or productive until 1927.)
Maine: Thomaston—Lawrence Portland Cement Co., New York, N. Y. (Under construction December 31, 1927.)
Maryland:
Security—North American Cement Corporation, Hagerstown.
Union Bridge—Lehigh Portland Cement Co., Allentown, Pa.
Michigan:
Alpena—Huron Portland Cement Co., Detroit.
Bay City—Aetna Portland Cement Co., Detroit.
Bellevue—Alpha Portland Cement Co., Easton, Pa.
Cement City—Consolidated Cement Corporation, Cement City.
Chelsea—Michigan State Cement Industry, Chelsea.
Coldwater—Wolverine Portland Cement Co., Coldwater.
Fenton—Aetna Portland Cement Co., Detroit.
New Egyptian Portland Cement Co., Detroit.
Newaygo—Newaygo Portland Cement Co., Newaygo.
Petoskey—Petoskey Portland Cement Co., Petoskey.
Port Huron—New Egyptian Portland Cement Co., Detroit.
Quincy—Wolverine Portland Cement Co., Coldwater.
River Rouge—Ford Motor Co., Highland Park.
Peerless Portland Cement Co., Detroit.
Union City—Peerless Portland Cement Co., Detroit.
Wyandotte—Wyandotte Portland Cement Co., Detroit.
Minnesota: Morgan Park—Universal Portland Cement Co., Chicago, Ill.
Missouri:
Cape Girardeau—Marquette Cement Manufacturing Co., Chicago, Ill.
Hannibal—Atlas Portland Cement Co., New York, N. Y.
Prospect Hill—Missouri Portland Cement Co., St. Louis.
St. Louis—Alpha Portland Cement Co., Easton, Pa.
Sugar Creek—Missouri Portland Cement Co., St. Louis.
Montana:
Hanover—Three Forks Portland Cement Co., Denver, Colo.
Trident—Three Forks Portland Cement Co., Denver, Colo.
Nebraska: Superior—Nebraska Cement Co., Denver, Colo.
New Jersey:
Stewartsville—Edison Portland Cement Co., Orange.
Vulcanite—Vulcanite Portland Cement Co., Philadelphia, Pa.
New York:
Alsen—Lehigh Portland Cement Co., Allentown, Pa.
North American Cement Corporation, Albany.
Buffalo—Federal Portland Cement Co. (Inc.), Buffalo. (Not completed or productive until 1927.)
Great Lakes Portland Cement Corporation, Buffalo. (Not completed or productive until 1927.)
Cementon—Alpha Portland Cement Co., Easton, Pa.
Glens Falls—Glens Falls Portland Cement Co., Glens Falls.
Howes Cave—North American Cement Corporation, Albany.
Hudson—Atlas Portland Cement Co., New York.
Knickerbocker Portland Cement Co., Albany.
Jamesville—Alpha Portland Cement Co., Easton, Pa.
Portland Point—Pennsylvania-Dixie Cement Corporation, Nazareth, Pa.
Ohio:
Baybridge—Sandusky Cement Co., Cleveland.
Castalia—Castalia Portland Cement Co., Pittsburgh, Pa.
Fairport—Standard Portland Cement Co., Painesville.
Fultonham—Pittsburgh Plate Glass Co., Zanesville.
Ironton—Alpha Portland Cement Co., Easton, Pa.
Middle Branch—Diamond Portland Cement Co., Cleveland.
Osborn—Southwestern Portland Cement Co., Osborn.
Wabash Portland Cement Co., Detroit, Mich.
Silica—Sandusky Cement Co., Cleveland.
Superior—Wellston Iron Furnace Co., Jackson.

Oklahoma:
Ada—Oklahoma Portland Cement Co., Denver, Colo.
Dewey—Dewey Portland Cement Co., Kansas City, Mo.
Oregon:
Gold Hill—Beaver Portland Cement Co., Portland.
Lime—Oregon Portland Cement Co., Portland.
Oswego—Oregon Portland Cement Co., Portland.
Pennsylvania:
Bath—Keystone Portland Cement Co., Bath. (Under construction December 31, 1927.)
Lehigh Portland Cement Co., Allentown.
Pennsylvania-Dixie Cement Corporation, Nazareth.
Bessemer—Bessemer Cement Corporation, Youngstown, Ohio.
Cementon—Whitehall Cement Manufacturing Co., Philadelphia.
Conshohocken—Valley Forge Cement Co., Catasauqua. (Not completed or productive until 1927.)
Coplay—Atlas Portland Cement Co., New York, N. Y.
Coplay Cement Manufacturing Co., Coplay.
Egypt—Giant Portland Cement Co., Philadelphia.
Evansville—Allentown Portland Cement Co., Catasauqua.
Fogelsville—Lehigh Portland Cement Co., Allentown.
Lesley—Giant Portland Cement Co., Philadelphia.
Martins Creek—Alpha Portland Cement Co., Easton.
Nazareth—Hercules Cement Corporation, Philadelphia.
Nazareth Cement Co., Nazareth.
Pennsylvania-Dixie Cement Corporation, Nazareth.
Phoenix Portland Cement Co., Nazareth.
New Castle—Lehigh Portland Cement Co., Allentown.
Northampton—Atlas Portland Cement Co., New York, N. Y.
Ormrod—Lehigh Portland Cement Co., Allentown.
Penn-Allen—Pennsylvania-Dixie Cement Corporation, Nazareth.
Sandts Eddy—Lehigh Portland Cement Co., Allentown.
Siegfried—Lawrence Portland Cement Co., New York, N. Y. (Also masonry and natural cements.)
Universal—Universal Portland Cement Co., Chicago, Ill.
Wampum—Crescent Portland Cement Co., Wampum.
West Coplay—Lehigh Portland Cement Co., Allentown.
West Winfield—West Penn Cement Co., Butler. (Not completed or productive until 1927.)
York—Sandusky Cement Co., Cleveland, Ohio.
South Dakota: Rapid City—South Dakota State Cement Commission, Rapid City.
Tennessee:
Caswell—Volunteer Portland Cement Co., Knoxville. (Under construction December 31, 1927.)
Chattanooga—Signal Mountain Portland Cement Co., Chattanooga.
Cowan—Cumberland Portland Cement Co., Cowan. (Not completed or productive until 1927.)
Kingsport—Pennsylvania-Dixie Cement Corporation, Chattanooga.
Nashville—Hermitage Portland Cement Co., Nashville.
Richard City—Pennsylvania-Dixie Cement Corporation, Chattanooga.
Texas:
Cement—Texas Portland Cement Co., Dallas.
Cementville—San Antonio Portland Cement Co., San Antonio.
Eagle Ford—Trinity Portland Cement Co., Dallas.
El Paso—Southwestern Portland Cement Co., El Paso.
Fort Worth—Trinity Portland Cement Co., Dallas.
Houston—Trinity Portland Cement Co., Dallas. (Not completed or productive until 1927.)
Manchester—Texas Portland Cement Co., Dallas.
Utah:
Bakers—Utah-Idaho Cement Co., Brigham.
Devils Slide—Union Portland Cement Co., Denver, Colo.
Salt Lake City—Portland Cement Co. of Utah, Salt Lake City.
Virginia:
Fordwick—Lehigh Portland Cement Co., Allentown, Pa.
Norfolk—Virginia Portland Cement Co., Norfolk.

Washington:
Bellingham—Olympic Portland Cement Co. (Ltd.), Seattle.
Concrete—Superior Portland Cement Co. (Inc.), Seattle.
Grotto—Northwestern Portland Cement Co., Grotto. (Under construction December 31, 1927.)
Irvin—International Portland Cement Co. (Ltd.), Spokane.
Metaline Falls—Lehigh Portland Cement Co., Allentown, Pa.
West Virginia:
Kenova—Basic Products Co., Kenova. (Not completed or productive until 1927.)
Manheim—Alpha Portland Cement Co., Easton, Pa.
Martinsburg—Standard Lime & Stone Co., Baltimore, Md. (Not completed or productive until 1927.)
Wisconsin: Manitowoc—Manitowoc Portland Cement Co., Manitowoc.
Wyoming: Laramie—Monolith-Portland Midwest Co., Los Angeles, Calif. (Under construction December 31, 1927.)

Masonry and natural cements

Illinois: Utica—Utica Hydraulic Cement Co., Utica.
Indiana: Speed—Louisville Cement Co., Louisville, Ky. (Also Portland cement.)
Kansas: Fort Scott—Fort Scott Hydraulic Cement Co., Fort Scott.
Kentucky: Kosmosdale—Kosmos Portland Cement Co., Louisville. (Also Portland cement.)
Minnesota:
Austin—Austin Cement Works, Mankato.
Carney—Carney Co., Mankato.
Mankato—Carney Co., Mankato.
New York:
Brixment—Louisville Cement Co., Louisville, Ky.
Rosendale—A. J. Snyder & Co., Rosendale.
Ohio: Lisbon (near)—Lisbon Cement Co., Lisbon.
Pennsylvania: Siegfried—Lawrence Portland Cement Co., New York, N. Y. (Also Portland cement.)

Puzzolan cement

Alabama: North Birmingham—Southern Cement Co., Birmingham.

PORTLAND CEMENT

PRODUCTION, SHIPMENTS, AND STOCKS

In 1926, of the 29 States in which Portland cement was manufactured 16 showed increases in production and 18 showed increases in shipments as compared with 1925. All the commercial districts except Wisconsin-Illinois-Indiana-Kentucky, eastern Missouri-Iowa-Minnesota-South Dakota, western Missouri-Nebraska-Kansas-Oklahoma, and Oregon-Washington showed increases in production and in shipments; the gains in production ranged from 0.3 to 13 per cent and in shipments from 0.02 to 19 per cent. The production of 164,530,170 barrels of 376 pounds net is equivalent to 658,120,680 sacks, 27,617,564 long tons, or 30,931,672 short tons. In 1926 production exceeded shipments by 2,343,080 barrels.

In the accompanying table the statistics are arranged by States, so far as possible. The term "active plant" is applied to a mill or group of mills situated at one place and operated by one company. If a company has establishments at different places, its mill or group of mills at each place is counted as a plant. In the table by districts the statistics are for groups of States that are geographically and commercially related.

Portland cement produced, shipped, and in stock in the United States, 1925–26, by States and districts

	Production					Shipments							Stock (Dec. 31)		
	Active plants		Barrels		Increase or decrease, 1926 (per cent)	1925		1926		Average factory value per barrel		Increase or decrease in quantity, 1926 (per cent)	Barrels		Increase or decrease, 1926 (per cent)
	1925	1926	1925	1926		Barrels	Value	Barrels	Value	1925	1926		1925 (revised)	1926	
STATE															
Alabama	5	5	6,288,117	6,709,829	+7	6,045,967	$9,824,439	6,693,900	$10,825,421	$1.62	$1.62	+11	387,497	403,426	+4
California	10	11	13,098,140	13,842,483	+6	13,109,426	26,159,531	13,660,078	25,299,245	2.00	1.85	+4	484,393	666,798	+38
Illinois	4	4	7,101,024	6,747,241	−5	6,749,532	11,481,576	6,977,598	11,388,800	1.70	1.63	+3	1,042,826	812,469	−22
Iowa	5	4	4,648,145	4,925,811	+6	4,856,849	8,674,563	4,788,639	8,167,341	1.79	1.71	−1	1,479,670	1,616,842	+9
Kansas	7	7	6,511,393	6,357,581	−2	6,513,297	10,861,506	6,150,694	9,757,699	1.67	1.59	−6	892,618	1,099,505	+23
Michigan	16	16	10,936,181	12,037,400	+10	10,073,453	17,511,908	11,959,447	19,499,788	1.74	1.63	+19	1,819,521	1,897,474	+4
Missouri	5	5	8,331,751	7,653,111	−8	8,168,165	14,155,795	7,639,966	12,917,342	1.73	1.69	−6	1,084,752	1,097,897	+1
New York	9	9	8,769,584	8,795,768	+.3	8,534,089	14,967,642	8,535,862	14,864,066	1.75	1.74	+.02	1,024,621	1,284,527	+25
Ohio	9	10	5,714,685	7,556,493	+32	5,426,768	9,600,084	7,422,720	12,831,503	1.77	1.73	+37	936,594	1,070,367	+14
Pennsylvania	22	23	42,346,830	42,865,694	+1	41,899,787	72,870,981	41,395,604	70,137,218	1.74	1.70	−1	3,249,649	4,719,739	+45
Texas	6	6	4,858,212	5,007,374	+3	4,735,521	8,729,046	5,042,359	9,522,701	1.84	1.89	+6	478,903	443,918	−7
Other States [1]	40	40	43,054,839	42,031,385	−2	41,182,358	73,687,037	41,920,223	72,454,349	1.79	1.73	+2	5,455,129	5,566,291	+2
	138	140	161,658,901	164,530,170	+2	157,295,212	278,524,108	162,187,090	277,965,473	1.77	1.71	+3	18,336,173	20,679,253	+13
DISTRICT															
Eastern Pennsylvania, New Jersey, and Maryland	22	23	40,279,457	42,139,204	+5	40,286,898	70,094,072	40,635,514	69,581,973	1.74	1.71	+1	2,577,771	4,081,461	+58
New York	9	9	8,769,584	8,795,768	+.3	8,534,089	14,967,642	8,535,862	14,864,066	1.75	1.74	+.02	1,024,621	1,284,527	+25
Ohio, western Pennsylvania, and West Virginia	14	15	15,572,602	15,913,500	+2	14,628,575	25,614,083	15,758,822	26,336,705	1.75	1.67	+8	2,306,030	2,460,708	+7
Michigan	16	16	10,936,181	12,037,400	+10	10,073,453	17,511,908	11,959,447	19,499,788	1.74	1.63	+19	1,819,521	1,897,474	+4
Wisconsin, Illinois, Indiana, and Kentucky	11	11	23,521,488	21,350,107	−9	22,052,884	37,792,110	21,876,629	36,267,413	1.71	1.66	−.8	3,510,364	2,983,842	−15
Virginia, Tennessee, Alabama, and Georgia	14	14	13,505,792	15,307,606	+13	13,048,251	21,581,494	14,963,262	24,860,207	1.65	1.66	+15	850,370	1,194,714	+40
Eastern Missouri, Iowa, Minnesota, and South Dakota	11	10	14,571,751	14,138,619	−3	14,477,932	25,317,292	14,026,247	23,754,460	1.75	1.69	−3	2,824,241	2,936,613	+4
Western Missouri, Nebraska, Kansas, and Oklahoma	11	11	10,672,816	10,277,391	−4	10,524,247	17,772,268	10,158,484	16,068,802	1.69	1.58	−3	1,658,502	1,777,409	+7
Texas	6	6	4,858,212	5,007,374	+3	4,735,521	8,729,046	5,042,359	9,522,701	1.84	1.89	+6	478,903	443,918	−7
Colorado, Montana, and Utah	7	7	2,299,071	2,523,509	+10	2,263,421	4,978,808	2,457,303	5,167,446	2.20	2.10	+9	417,613	483,819	+16
California	10	11	13,098,140	13,842,483	+6	13,109,426	26,159,531	13,660,078	25,299,245	2.00	1.85	+4	484,393	666,798	+38
Oregon and Washington	7	7	3,573,807	3,197,209	−11	3,560,515	8,005,854	3,113,083	6,742,667	2.25	2.17	−13	383,844	467,970	+22
	138	140	161,658,901	164,530,170	+2	157,295,212	278,524,108	162,187,090	277,965,473	1.77	1.71	+3	18,336,173	20,679,253	+13

[1] Includes Colorado, Georgia, Indiana, Kentucky, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

The accompanying table which shows production, shipments, and stocks of finished Portland cement by districts and by months for 1926, with totals by months for 1925, has been compiled from monthly reports on operation of all plants except two plants each month, for which estimates have been included. Although the figures only approximate the totals shown by other tables, which are based on final annual reports from the producers, they reflect accurately the fluctuations in the industry during the year. In December, January, and February, in the colder part of the United States, production of Portland cement is necessarily somewhat curtailed by weather, as are also demand and hence shipments from the mills. In addition, mills often close for repairs during the winter, when demand is lowest. As the quantity of clinker, or unground cement, produced and in reserve at the mills awaiting manufacture into finished cement is of interest, the table appended shows these statistics compiled from estimates by the manufacturers.

Summary of monthly estimates of Portland cement produced, shipped, and in stock at mills in the United States in 1926, by districts, in thousands of barrels

District	January	February	March	April	May	June	July	August	September	October	November	December
PRODUCTION												
Eastern Pennsylvania, New Jersey, and Maryland	2,765	2,447	3,032	3,258	3,939	3,956	3,935	3,901	3,936	3,986	3,617	2,875
New York	623	288	374	517	861	890	911	936	948	999	820	634
Ohio, western Pennsylvania, and West Virginia	523	739	626	1,248	1,825	1,665	1,851	1,824	1,797	1,795	1,157	851
Michigan	292	288	223	762	1,290	1,430	1,506	1,508	1,415	1,338	1,227	741
Wisconsin, Illinois, Indiana, and Kentucky	542	775	1,208	1,400	2,238	2,397	2,438	2,414	2,326	2,160	1,930	1,530
Virginia, Tennessee, Alabama, and Georgia	961	1,029	1,241	1,260	1,428	1,468	1,445	1,366	1,368	1,430	1,290	1,022
Eastern Missouri, Iowa, Minnesota, and South Dakota	435	483	744	1,134	1,518	1,545	1,576	1,561	1,470	1,458	1,310	904
Western Missouri, Nebraska, Kansas, and Oklahoma	225	361	848	854	1,116	1,129	1,067	1,162	1,046	1,032	821	616
Texas	330	393	452	411	454	416	459	440	437	428	402	379
Colorado, Montana, and Utah	48	70	142	240	273	311	312	309	247	275	200	87
California	1,034	743	1,259	1,009	1,233	1,281	1,302	1,248	1,272	1,381	1,154	982
Oregon and Washington	109	115	241	317	335	378	332	326	309	314	265	136
United States, 1926	7,887	7,731	10,390	12,440	16,510	16,866	17,134	16,995	16,571	16,596	14,193	10,757
1925	8,856	8,255	11,034	13,807	15,503	15,387	15,641	16,419	15,939	15,992	13,656	10,713
SHIPMENTS												
Eastern Pennsylvania, New Jersey, and Maryland	1,469	1,137	2,416	3,679	4,620	4,629	4,215	4,212	4,593	4,272	3,356	1,582
New York	205	145	335	660	928	1,081	1,146	1,086	1,194	921	609	233
Ohio, western Pennsylvania, and West Virginia	382	402	679	1,195	1,921	2,051	2,053	1,897	1,903	1,668	1,067	543
Michigan	212	237	390	610	1,301	1,614	1,681	1,806	1,614	1,385	781	330
Wisconsin, Illinois, Indiana, and Kentucky	476	649	942	1,550	2,598	2,873	3,017	2,889	2,451	2,656	1,143	632
Virginia, Tennessee, Alabama, and Georgia	845	937	1,189	1,311	1,420	1,411	1,419	1,427	1,428	1,391	1,233	951
Eastern Missouri, Iowa, Minnesota, and South Dakota	281	396	724	1,142	1,777	1,946	1,756	1,720	1,556	1,842	602	284
Western Missouri, Nebraska, Kansas, and Oklahoma	325	518	760	899	1,131	1,105	1,160	1,192	970	984	739	380
Texas	308	400	403	447	447	454	464	494	438	444	427	316
Colorado, Montana, and Utah	73	106	191	225	256	289	269	297	288	252	142	69
California	984	765	1,264	958	1,259	1,305	1,276	1,258	1,318	1,359	972	978
Oregon and Washington	114	128	246	289	315	376	356	305	334	312	205	134
United States, 1926	5,674	5,820	9,539	12,965	17,973	19,134	18,812	18,583	18,087	17,486	11,276	6,432
1925	5,162	6,015	10,279	14,394	16,735	17,501	18,131	18,383	17,711	15,309	10,187	6,917

Summary of monthly estimates of Portland cement produced, shipped, and in stock at mills in the United States in 1926, by districts, in thousands of barrels—Continued

District	January	February	March	April	May	June	July	August	September	October	November	December
STOCKS (END OF MONTH)												
Eastern Pennsylvania, New Jersey, and Maryland	3,805	5,115	5,732	5,311	4,629	3,967	3,687	3,375	2,718	2,437	2,697	4,081
New York	1,447	1,590	1,629	1,485	1,418	1,227	992	842	596	685	883	1,284
Ohio, western Pennsylvania, and West Virginia	2,455	2,792	2,739	2,792	2,697	2,310	2,109	2,036	1,930	2,062	2,151	2,461
Michigan	1,994	1,947	1,780	1,931	1,915	1,734	1,558	1,261	1,062	1,025	1,486	1,897
Wisconsin, Illinois, Indiana, and Kentucky	3,574	3,700	3,966	3,816	3,455	2,980	2,400	1,925	1,792	1,296	2,084	2,984
Virginia, Tennessee, Alabama, and Georgia	966	1,058	1,111	1,059	1,068	1,125	1,150	1,089	1,029	1,067	1,124	1,195
Eastern Missouri, Iowa, Minnesota, and South Dakota	2,979	3,066	3,087	3,078	2,819	2,417	2,237	2,078	1,992	1,609	2,317	2,937
Western Missouri, Nebraska, Kansas, and Oklahoma	1,556	1,399	1,487	1,443	1,430	1,454	1,362	1,331	1,407	1,455	1,538	1,777
Texas	502	488	536	501	515	478	472	418	417	406	381	444
Colorado, Montana, and Utah	392	357	308	322	348	369	413	425	384	406	454	484
California	533	507	501	553	526	502	508	504	458	480	662	667
Oregon and Washington	379	366	360	419	435	437	413	434	403	406	466	468
United States, 1926	20,582	22,385	23,236	22,710	21,255	19,000	17,301	15,718	14,188	13,334	16,243	20,679
1925	17,656	19,689	20,469	19,877	18,440	16,409	13,896	11,952	10,247	10,979	14,534	[1] 18,336

[1] Revised figures.

Summary of monthly estimates of clinker (unground Portland cement) produced and in stock at mills in the United States in 1926, by districts, in thousands of barrels

District	January	February	March	April	May	June	July	August	September	October	November	December	Year
PRODUCTION													
Eastern Pennsylvania, New Jersey, and Maryland	3,093	2,818	3,274	3,461	3,673	3,642	3,686	3,677	3,670	3,828	3,599	3,109	41,530
New York	748	347	465	654	767	750	805	890	887	930	837	796	8,876
Ohio, western Pennsylvania, and West Virginia	1,096	989	990	1,313	1,520	1,502	1,557	1,664	1,530	1,610	1,300	1,265	16,336
Michigan	682	538	440	683	1,103	1,205	1,297	1,288	1,238	1,233	1,169	921	11,797
Wisconsin, Illinois, Indiana, and Kentucky	1,028	1,220	1,627	1,604	1,966	2,033	1,991	2,051	1,993	2,031	1,841	1,673	21,058
Virginia, Tennessee, Alabama, and Georgia	1,166	1,164	1,274	1,233	1,339	1,345	1,325	1,286	1,296	1,385	1,312	1,154	15,279
Eastern Missouri, Iowa, Minnesota, and South Dakota	626	565	817	1,223	1,371	1,380	1,418	1,433	1,389	1,440	1,304	962	13,928
Western Missouri, Nebraska, Kansas, and Oklahoma	283	338	808	839	1,087	1,082	1,034	1,021	986	973	789	701	9,941
Texas	334	374	452	395	443	418	430	407	415	396	398	399	4,861
Colorado, Montana, and Utah	40	86	86	159	198	239	207	269	257	302	301	305	2,449
California	1,110	831	1,131	1,087	1,193	1,204	1,317	1,306	1,260	1,335	1,249	1,051	14,074
Oregon and Washington	210	207	291	316	345	325	314	293	241	257	285	251	3,335
United States, 1926	10,416	9,477	11,655	12,967	15,005	15,125	15,381	15,585	15,162	15,720	14,384	12,587	163,464
1925	10,286	9,613	12,343	13,436	14,497	14,103	14,443	14,973	14,714	15,324	14,414	11,952	160,098
STOCKS (END OF MONTH)													
Eastern Pennsylvania, New Jersey, and Maryland	697	1,134	1,417	1,669	1,464	1,208	1,027	861	663	562	630	912	----
New York	316	375	467	604	532	396	295	253	201	127	163	331	----
Ohio, western Pennsylvania, and West Virginia	1,513	1,768	2,137	2,210	1,926	1,778	1,503	1,363	1,115	946	1,107	1,529	----
Michigan	1,134	1,387	1,603	1,530	1,357	1,153	943	733	563	470	420	606	----
Wisconsin, Illinois, Indiana, and Kentucky	1,297	1,746	2,167	2,378	2,118	1,767	1,333	980	656	528	442	593	----
Virginia, Tennessee, Alabama, and Georgia	597	746	798	796	742	643	549	492	443	426	468	616	----
Eastern Missouri, Iowa, Minnesota, and South Dakota	795	879	957	1,059	929	780	637	524	441	422	432	499	----
Western Missouri, Nebraska, Kansas, and Oklahoma	856	835	799	790	768	737	712	582	530	480	452	628	----
Texas	236	222	228	217	211	218	194	165	148	123	124	150	----
Colorado, Montana, and Utah	539	560	506	447	396	323	241	201	211	238	339	557	----
California	831	922	798	880	846	781	822	885	879	838	937	1,011	----
Oregon and Washington	263	357	413	387	406	360	348	323	262	210	249	367	----
United States, 1926	9,074	10,931	12,290	12,967	11,695	10,144	8,604	7,362	6,112	5,370	5,763	7,799	----
1925	7,017	8,497	9,962	9,731	9,053	7,937	6,961	5,640	4,561	4,086	5,013	6,469	----

The stock of Portland cement reported on hand at the mills each month in 1926, as in 1925, showed an increase over the corresponding month in the preceding year. The stock at the end of 1926 exceeded the average for the five preceding years (12,969,065 barrels) by nearly 60 per cent. The totals by States and districts are shown in the preceding tables.

Finished Portland cement in stock at mills in the United States, December 31, 1917–1926, in barrels

1917	10, 353, 838	1922	9, 352, 250
1918	10, 451, 044	1923	10, 812, 639
1919	5, 256, 900	1924	14, 151, 695
1920	8, 833, 067	1925	[1] 18, 336, 173
1921	12, 192, 567	1926	20, 679, 253

DOMESTIC CONSUMPTION

The total consumption of Portland cement in the United States may be estimated by adding the imports to the shipments and subtracting the exports from the sum. Of course, at any time a variable but considerable quantity of cement is in transit, in warehouses at distributing points, and awaiting use at jobs, so that the estimate thus made is at best only approximate. Another fact that impairs the accuracy of the estimate is that the cement imported and exported is classed as hydraulic cement, hence the records do not discriminate between Portland and other cements and probably include some plaster also. Portland cement, however, constitutes by far the greater part of the exports. The apparent domestic consumption in 1926 showed an increase of 3 per cent as compared with the consumption in 1925.

Portland cement available for consumption in the United States, 1917–1926, in barrels

Year	Shipments	Imports	Exports	Available for consumption
1917	90, 703, 474	2, 323	2, 586, 215	88, 119, 582
1918	70, 915, 508	305	2, 252, 446	68, 663, 367
1919	85, 612, 899	8, 931	2, 463, 573	83, 158, 257
1920	96, 311, 719	524, 604	2, 985, 807	93, 850, 516
1921	95, 507, 147	122, 322	1, 181, 014	94, 448, 455
1922	117, 701, 216	323, 823	1, 127, 845	116, 897, 194
1923	135, 912, 118	1, 678, 636	1, 001, 688	136, 589, 066
1924	146, 047, 549	2, 010, 936	878, 543	147, 179, 942
1925	157, 295, 212	3, 655, 317	1, 019, 597	159, 930, 932
1926	162, 187, 090	3, 232, 386	974, 326	164, 445, 150

Furthermore, the only available gauge of consumption of Portland cement by States is the record of shipments by manufacturers into the several States and is therefore merely approximate. The shipments of cement into a State during a year do not equal the consumption in that State during the same year, but shipments over a long period should afford a fair index of consumption. The simplest available common unit is the estimated consumption in barrels per capita,

[1] Revised figures.

which is obtained by comparing the shipments into the several States with the population of those States. The following table shows such figures for 1925 and 1926. The estimates of population used in calculating the per capita consumption are those of the Bureau of the Census.

The official figures for exports of cement, as given on page 333, differ from the exports reported by manufacturers, as shown in the following table, because cement forwarded from mills and destined for foreign countries and for Alaska, Hawaii, and Porto Rico is reported by the shipper as exported, whether or not it leaves the country during the calendar year; but the Bureau of Foreign and Domestic Commerce export figures record the cement that actually leaves the country during the period specified. (Shipments to Alaska, Hawaii, and Porto Rico are given on p. 332.) The exports given by that bureau for 1926 include all other hydraulic cement exported, whereas the table of per capita consumption relates only to Portland cement.

The per capita consumption shown by the table necessarily falls short of the total apparent consumption by the quantity of the imports. These increase the consumption in certain States near the Canadian border and the seaboard; in 1926 they increased the general average per capita consumption by about 0.028 barrel.

There were 26 States in which the per capita consumption in 1926 was 1 barrel or more—11 of them west and 15 of them east of Mississippi River. Two southern States, Florida and North Carolina, are included in this class. Florida alone exceeded three barrels, but California was a close second with nearly three barrels.

The general average consumption for the United States was 1.37 barrels as compared with 1.38 barrels in 1925. The range from 1914 to 1925 was from 0.64 to 1.38 barrels.[2]

[2] Data on per capita consumption of Portland cement by States, beginning with 1914, are given in preceding volumes of Mineral Resources of the United States.

Shipments of domestic Portland cement from mills into States and per capita, 1925–26 in barrels [1]

State	1925		1926	
	Total	Per capita [1]	Total	Per capita [1]
Alabama	2,084,922	0.85	1,981,011	0.78
Arizona [2]	423,523	1.04	426,261	.96
Arkansas [2]	800,407	.43	769,808	.40
California	12,433,619	3.09	12,691,277	2.94
Colorado	1,152,498	1.13	1,138,301	1.07
Connecticut [2]	1,758,443	1.15	1,856,786	1.16
Delaware [2]	401,923	1.71	360,193	1.50
District of Columbia [2]	886,236	1.78	907,342	1.72
Florida [2]	4,150,091	3.28	4,373,917	3.32
Georgia	1,438,009	.47	1,831,276	.58
Idaho [2]	258,553	.53	443,737	.85
Illinois	14,404,947	2.07	14,066,500	1.95
Indiana	4,997,971	1.63	5,174,533	1.66
Iowa	2,704,872	1.08	2,826,839	1.17
Kansas	2,257,447	1.25	2,286,661	1.26
Kentucky	1,796,397	.72	1,659,087	.66
Louisiana [2]	1,100,099	.59	1,187,453	.62
Maine [2]	333,829	.43	548,155	.69
Maryland	2,127,479	1.38	2,318,564	1.47
Massachusetts [2]	3,418,028	.83	2,982,987	.71
Michigan	9,564,976	2.31	10,784,049	2.45
Minnesota	3,615,328	1.41	3,572,711	1.35
Mississippi [2]	579,239	.32	804,351	.45
Missouri	5,600,510	1.62	5,201,961	1.49
Montana	235,525	.36	257,741	.37
Nebraska	1,674,944	1.24	1,554,967	1.12
Nevada [2]	100,997	1.30	94,644	1.22
New Hampshire [2]	426,138	.95	438,350	.97
New Jersey	7,082,207	2.02	7,116,109	1.93
New Mexico [2]	181,927	.48	192,718	.50
New York	18,488,762	1.66	20,224,702	1.79
North Carolina [2]	3,024,621	1.10	3,731,959	1.31
North Dakota [2]	341,841	.50	402,546	.63
Ohio	9,221,005	1.46	9,683,538	1.47
Oklahoma	2,377,673	1.06	2,343,201	1.00
Oregon	1,318,163	1.56	1,318,252	1.50
Pennsylvania	14,932,787	1.60	13,839,552	1.44
Rhode Island [2]	711,391	1.05	634,626	.92
South Carolina [2]	864,166	.49	638,972	.35
South Dakota	461,726	.68	423,831	.62
Tennessee	1,644,029	.68	1,933,409	.78
Texas	4,188,910	.82	4,877,987	.92
Utah	381,018	.77	461,338	.90
Vermont [2]	217,286	.62	271,615	.77
Virginia	1,648,744	.67	1,733,734	.69
Washington	2,427,263	1.64	2,021,986	1.31
West Virginia	1,487,663	.93	1,679,574	1.01
Wisconsin	4,105,100	1.47	4,621,975	1.60
Wyoming [2]	225,170	1.01	188,590	.80
Unspecified	59,272		60,031	
	156,117,674	1.38	160,939,707	1.37
Exports reported by manufacturers but not included above [3]	1,177,538		1,247,383	
Total shipped from cement plants	157,295,212		162,187,090	

[1] Per capita figures based on estimate of population made by the Bureau of the Census.
[2] Noncement-producing State.
[3] Includes shipments to Alaska, Hawaii, and Porto Rico.

The Bureau of Mines has had no facilities for collecting statistics on the consumption of Portland cement by uses. The following, which are rough estimates with the exception of the figures on "Paving and highways," which are considered substantially accurate, were made by engineers of the Portland Cement Association who are in touch with the various industries throughout the country that consume cement and were published in the magazine Concrete.

Estimated consumption of Portland cement in the United States in 1926, by uses [1]

Use	Per cent
Public and commercial buildings	26.0
Houses (exclusive of rural)	8.5
Sidewalks and private driveways (exclusive of rural)	5.5
Small town and farm uses	18.0
Sewerage, drainage, irrigation, culverts, concrete pipe	4.5
Paving and highways	27.5
Railways	5.5
Bridges, river and harbor work, dams and water power projects, storage tanks and reservoirs	3.0
Miscellaneous uses	1.5
	100.0

[1] From Concrete, May, 1926.

LOCAL SUPPLIES

The following table compares the shipments from the mills within a State or group of States with the estimated consumption (State receipts of mill shipments) and indicates the surplus or deficiency in the supply of cement locally available. Consumption in the States that do not produce cement is also indicated in the table on page 318. Data for 1916 to 1924 will be found in Mineral Resources of the United States for 1917 to 1924.

The surplus shown in the following table was distributed by years, as follows: In 1925, to noncement-producing States, 20,203,908 barrels; to foreign countries and to Alaska, Hawaii, and Porto Rico, 1,177,538 barrels; unspecified, 59,272 barrels. In 1926, to noncement-producing States, 21,255,010 barrels; to foreign countries and to Alaska, Hawaii, and Porto Rico, 1,247,383 barrels; unspecified, 60,031 barrels.

Estimated surplus or deficiency in local supply of Portland cement in cement-producing States, 1925–26, in barrels

State or division	1925			1926		
	Shipments from mills	Estimated consumption	Surplus or deficiency	Shipments from mills	Estimated consumption	Surplus or deficiency
Alabama	6,045,967	2,084,922	+3,961,045	6,693,900	1,981,011	+4,712,889
California	13,109,426	12,433,619	+675,807	13,660,078	12,691,277	+968,801
Illinois	6,749,532	14,404,947	−7,655,415	6,977,598	14,066,500	−7,088,902
Iowa	4,856,849	2,704,872	+2,151,977	4,788,639	2,826,839	+1,961,800
Kansas	6,513,297	2,257,447	+4,255,850	6,150,694	2,286,661	+3,864,033
Michigan	10,073,453	9,564,976	+508,477	11,959,447	10,784,049	+1,175,398
Missouri	8,168,165	5,600,510	+2,567,655	7,639,966	5,201,961	+2,438,005
New York	8,534,089	18,488,762	−9,954,673	8,535,862	20,224,702	−11,688,840
Ohio	5,426,768	9,221,005	−3,794,237	7,422,720	9,683,538	−2,260,818
Pennsylvania	41,899,787	14,932,787	+26,967,000	41,395,604	13,839,552	+27,556,052
Texas	4,735,521	4,188,910	+546,611	5,042,359	4,877,987	+164,372
Colorado, Montana, and Utah	2,263,421	1,769,041	+494,380	2,457,303	1,857,380	+599,923
Oregon and Washington	3,560,515	3,745,426	−184,911	3,113,083	3,340,238	−227,155
Georgia, Kentucky, Tennessee, and Virginia	7,721,210	6,527,179	+1,194,031	8,878,250	7,157,506	+1,720,744
Indiana, Wisconsin, Minnesota, Nebraska, Oklahoma, and South Dakota	20,048,294	17,232,742	+2,815,552	19,895,575	17,691,218	+2,204,357
Maryland, New Jersey, and West Virginia	7,588,918	10,697,349	−3,108,431	7,576,012	11,114,247	−3,538,235
	157,295,212	135,854,494	+21,440,718	162,187,090	139,624,666	+22,562,424

The following table, which shows by months the shipments from Portland cement mills into States during 1926, has been compiled from monthly reports of producers but includes estimates of the distribution of shipments from three to five plants each month. Although the figures only approximate the totals shown in the other tables, which are based on final annual reports from the producers, they reflect the fluctuations in shipments during the year.

Portland cement shipped from mills into States in 1926, by months, in barrels [1]

Shipped to—	January	February	March	April	May	June
Alabama	129,291	145,636	158,310	215,372	184,774	215,892
Alaska	165	264	917	957	2,296	1,130
Arizona	38,869	28,956	54,916	40,257	37,717	46,262
Arkansas	46,708	55,984	66,712	62,646	64,713	66,835
California	931,238	714,783	1,156,509	850,124	1,165,540	1,187,724
Colorado	29,203	51,068	81,623	104,386	119,761	124,451
Connecticut	40,300	29,323	78,962	149,459	209,515	206,301
Delaware	9,019	6,437	22,386	48,259	38,972	45,642
District of Columbia	35,304	47,086	63,249	82,579	85,961	86,218
Florida	483,824	445,674	402,888	323,909	386,712	297,204
Georgia	80,129	86,417	139,781	171,829	186,398	174,488
Hawaii	10,757	15,830	24,737	27,999	13,705	14,360
Idaho	19,198	19,524	42,131	47,688	58,044	54,424
Illinois	323,947	429,654	570,121	961,612	1,671,317	1,854,806
Indiana	85,724	121,253	190,063	310,301	570,942	673,087
Iowa	28,439	50,077	116,367	219,716	317,323	329,422
Kansas	56,598	114,296	182,003	204,165	259,208	247,335
Kentucky	35,560	56,249	88,790	141,326	188,486	181,121
Louisiana	65,695	84,706	96,214	99,889	96,519	106,338
Maine	20,310	19,084	18,302	33,345	51,441	66,264
Maryland	85,495	77,537	132,720	199,076	279,126	244,763
Massachusetts	101,212	57,390	168,271	298,326	362,878	338,079
Michigan	222,061	253,661	396,643	576,865	1,182,060	1,439,270
Minnesota	66,063	72,714	164,405	296,040	496,800	526,695
Mississippi	44,140	47,179	58,308	65,511	73,146	73,345
Missouri	137,343	202,914	332,104	505,850	696,773	631,184
Montana	9,716	9,867	17,203	23,063	23,832	23,114
Nebraska	23,788	49,054	121,456	170,591	190,275	187,780
Nevada	2,508	5,754	8,824	8,478	8,165	9,895
New Hampshire	17,081	12,750	18,043	37,909	46,559	48,285
New Jersey	257,544	163,588	424,812	653,779	770,730	773,450
New Mexico	12,019	14,308	18,594	15,861	12,004	16,222
New York	592,584	434,323	1,026,903	1,633,864	2,223,644	2,475,868
North Carolina	81,764	139,656	271,422	357,978	424,474	420,248
North Dakota	3,338	4,903	23,260	39,039	58,351	75,470
Ohio	220,728	250,265	420,536	674,151	1,200,619	1,319,226
Oklahoma	101,087	167,043	206,766	220,016	229,209	219,946
Oregon	53,995	58,991	117,611	126,874	127,318	150,962
Pennsylvania	423,443	351,940	745,395	1,243,762	1,614,063	1,697,387
Rhode Island	18,409	10,166	34,838	64,303	96,407	80,912
South Carolina	44,723	56,022	69,811	49,573	58,544	47,279
South Dakota	6,413	18,848	38,194	43,693	61,899	53,091
Tennessee	66,379	86,871	117,610	178,683	201,130	206,917
Texas	270,231	364,107	367,833	411,203	431,778	447,231
Utah	10,655	15,613	37,117	35,218	38,301	66,883
Vermont	2,072	1,640	5,052	14,358	28,202	32,291
Virginia	61,645	77,572	121,765	161,284	196,368	211,665
Washington	72,393	77,936	152,534	189,037	212,259	260,756
West Virginia	39,983	45,121	89,108	154,310	217,546	208,797
Wisconsin	60,400	80,066	155,840	277,248	537,441	691,934
Wyoming	5,797	11,710	12,225	13,887	17,558	20,331
Unspecified	17,254	20,827	37,724	57,493	70,063	80,565
	5,602,541	5,762,637	9,467,908	12,893,141	17,896,866	19,059,145
Foreign countries	71,459	57,363	71,092	71,859	76,134	74,855
Total shipped from cement plants	5,674,000	5,820,000	9,539,000	12,965,000	17,973,000	19,134,000

[1] Includes estimated distribution from four plants for January, February, April, and June and from five plants for March and May and for July to December.

Portland cement shipped from mills into States in 1926, by months, in barrels—Con.

Shipped to—	July	August	September	October	November	December
Alabama	184,577	173,619	153,636	169,086	134,009	117,426
Alaska	1,386	1,130	668	132	173	297
Arizona	35,817	45,553	42,709	44,360	27,412	39,536
Arkansas	73,292	71,312	75,962	70,785	79,627	42,245
California	1,173,099	1,165,387	1,204,615	1,276,210	887,351	901,526
Colorado	117,990	133,172	137,054	113,951	61,057	31,711
Connecticut	218,375	224,946	255,785	242,167	147,288	52,141
Delaware	38,228	35,287	46,600	44,898	17,682	6,528
District of Columbia	94,852	75,684	94,183	90,347	78,369	64,457
Florida	284,281	330,285	315,214	343,404	418,696	317,402
Georgia	213,432	188,201	160,377	148,699	161,710	110,139
Hawaii	12,761	8,895	17,179	16,887	21,417	25,732
Idaho	47,991	44,589	34,221	33,444	25,409	13,199
Illinois	1,857,871	1,806,446	1,458,052	1,918,899	776,758	446,515
Indiana	698,427	702,574	646,062	719,882	289,720	108,771
Iowa	353,529	412,046	350,251	501,683	116,116	37,157
Kansas	230,022	260,169	226,069	244,497	169,035	88,010
Kentucky	200,154	175,705	246,310	192,177	120,647	62,172
Louisiana	112,958	121,260	108,642	123,139	74,619	89,843
Maine	67,475	108,161	90,934	47,136	19,168	6,255
Maryland	221,600	208,790	249,489	270,241	212,972	135,181
Massachusetts	331,320	349,319	358,853	305,190	234,087	72,231
Michigan	1,504,056	1,570,296	1,372,831	1,159,596	702,901	292,167
Minnesota	475,846	437,014	407,570	384,739	87,777	40,916
Mississippi	89,752	80,109	79,924	68,149	61,685	60,858
Missouri	653,615	611,020	457,632	498,449	315,318	152,647
Montana	38,749	31,256	30,597	27,916	16,169	6,455
Nebraska	172,489	201,211	169,159	173,552	64,198	26,933
Nevada	7,878	9,088	10,291	7,955	4,751	3,150
New Hampshire	55,233	49,958	56,092	44,983	32,190	18,340
New Jersey	793,625	691,453	866,717	856,615	688,736	255,744
New Mexico	14,736	21,231	17,738	22,127	18,965	13,639
New York	2,336,788	2,329,217	2,490,511	2,107,119	1,584,352	788,046
North Carolina	396,618	376,779	412,719	382,736	276,568	183,912
North Dakota	62,581	43,493	46,528	30,647	8,969	2,439
Ohio	1,272,308	1,235,463	1,137,722	989,005	651,257	312,336
Oklahoma	205,345	236,223	219,399	188,144	225,767	120,560
Oregon	151,296	128,525	150,679	126,946	75,541	47,637
Pennsylvania	1,618,569	1,493,733	1,620,018	1,415,233	1,013,955	469,376
Porto Rico					7,250	13,250
Rhode Island	65,525	66,573	56,575	72,653	47,278	19,813
South Carolina	53,506	62,408	55,967	61,636	46,692	31,523
South Dakota	46,987	44,054	47,794	48,761	10,076	3,625
Tennessee	213,058	207,528	239,051	203,406	124,551	82,556
Texas	481,008	484,822	430,727	441,775	419,358	303,770
Utah	50,306	54,276	56,948	64,504	34,358	12,944
Vermont	38,607	49,660	50,697	34,591	14,455	3,844
Virginia	180,085	182,011	191,720	151,319	127,290	61,351
Washington	239,146	198,993	202,117	191,453	131,602	90,856
West Virginia	214,948	162,494	188,894	143,112	104,150	63,680
Wisconsin	704,770	715,784	594,999	582,919	169,068	95,776
Wyoming	19,973	24,901	23,893	15,475	8,160	7,430
Unspecified	599	70,233	73,748	13,132	54,253	396
	18,727,439	18,512,336	18,032,122	17,425,861	11,200,962	6,354,439
Foreign countries	84,561	70,664	54,878	60,139	75,038	77,561
Total shipped from cement plants	18,812,000	18,583,000	18,087,000	17,486,000	11,276,000	6,432,000

PRICES

AT FACTORIES

Average values of Portland cement sold at the factories as reported to the Bureau of Mines are shown in the table of shipments by States and districts during 1925 and 1926 (p. 311). The averages by districts ranged from $1.58 a barrel in the western Missouri-Nebraska-Kansas-Oklahoma district to $2.17 in the Oregon-Washington district in 1926, as compared with a range from $1.65 a barrel in the Virginia-Tennessee-Alabama-Georgia district to $2.25 a barrel in the Oregon-

Washington district in 1925. The general average value for the whole country showed a decrease in 1926 of more than 3 per cent, and averages were lower in all the districts except Virginia-Tennessee-Alabama-Georgia and Texas, and in all the States except Tennessee, Texas, Virginia, and Wisconsin. In Alabama the average remained virtually the same as in 1925.

For certain States the average factory value of Portland cement may be higher than it would be if the ordinary structural cement were the only kind considered in the average. This is due to the marketing of certain special cements that command higher prices. Among these are the white Portland cement made in Pennsylvania and also the cements particularly intended for shutting out water in oil wells and for stucco finish, both of which are made in California. Oil wells require a rapid-setting cement, and for stucco a cement should be more than ordinarily plastic and waterproof. A plant in Tennessee, equipped for the manufacture of white cement, was under construction at the end of 1926.

Average factory value per barrel in bulk of Portland cement, 1915–1926

1915	$0.86	1919	$1.71	1923	$1.90
1916	1.10	1920	2.02	1924	1.81
1917	1.35	1921	1.89	1925	1.77
1918	1.60	1922	1.76	1926	1.71

AT MARKETS

The following table summarizes the wholesale prices of Portland cement in bulk in carload lots at the principal cities of the United States and at Montreal, Canada, for 1925 and 1926, by months, as published in the Engineering News-Record. Seeming inconsistencies in the table, such as sudden large changes in prices, suggest the inclusion of delivery charges that the explanatory footnote does not account for. The price figures may be compared in several different ways. Prices at a single locality for corresponding months in 1925 and 1926 and for the several months of the same year and prices at different localities can readily be compared. As with factory values, the net movement of market prices in 1926, as in 1925, was downward; the decreases ranged from 2 to 65 cents a barrel.

The increase in the prices of building materials and of all other commodities since the beginning of the World War has so seriously affected living conditions that many inquiries into the price situation have naturally followed. As the annual per capita consumption of Portland cement in the United States has reached nearly 1⅔ barrels and promises to continue to increase, the prices of such an essential building material have attracted particular interest. Considerable information is now available to show the position of cement prices among those of other structural materials and to explain the economic conditions that determine them. Data of interest in this connection are now compiled and published by the United States Department of Labor, Bureau of Labor Statistics.

Wholesale prices of Portland cement per barrel in bulk in carload lots, 1925–26, by months [1]

City	January		February		March		April		May		June	
	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926
Atlanta	$2.35	$2.30	$2.35	$2.35	$2.30	$2.35	$2.30	$2.35	$2.30	$2.35	$2.30	$2.25
Baltimore	2.50	2.50	2.90	2.50	2.50	2.35	2.50	2.50	2.50	2.35	2.50	2.35
Birmingham	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Boston	2.67½	2.40	2.60	2.40	2.55	2.40	2.55	2.40	2.55	2.40	2.55	2.35
Cedar Rapids	2.38	2.34	2.44	2.34	2.44	2.34	2.44	2.34	2.44	2.34	2.44	2.34
Chicago	2.10	2.10	2.20	2.10	2.20	2.10	2.20	2.10	2.20	2.10	2.20	2.10
Cincinnati	2.37	2.37	2.47	2.37	2.47	2.37	2.47	2.37	2.47	2.37	2.47	2.37
Cleveland	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29
Dallas	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Davenport	2.29	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29
Denver	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.85	2.84	2.85
Detroit	2.40	2.15	2.35	2.15	2.35	2.15	2.35	2.15	2.35	2.15	2.35	2.15
Duluth	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09
Indianapolis	2.31	2.29	2.41	2.29	2.41	2.29	2.41	2.29	2.41	2.29	2.41	2.29
Jersey City	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Kansas City	2.07	2.40	2.30	2.02	2.07	2.35	2.28	2.35	2.28	2.35	2.28	2.35
Los Angeles	2.60	2.52	2.80	2.52	2.80	2.52	2.80	2.52	2.80	2.36	2.80	2.36
Milwaukee	2.25	2.25	2.35	2.25	2.35	2.25	2.35	2.25	2.35	2.25	2.35	2.25
Minneapolis	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32
Montreal	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.42	1.80	1.42
New Orleans	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.30	2.40	2.30
New York (delivered)	2.50–2.60	2.50–2.70	2.50–2.60	2.50–2.70	2.50–2.60	2.50–2.70	2.50–2.60	2.50	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60
New York (alongside dock to dealers)	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Peoria	2.27	2.27	2.37	2.27	2.37	2.27	2.37	2.27	2.37	2.27	2.37	2.27
Philadelphia	2.41	2.60	2.41	2.60	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Pittsburgh	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09
St. Louis	2.20	2.20	2.30	2.20	2.30	2.20	2.30	2.20	2.30	2.20	2.30	2.20
St. Paul	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32
San Francisco	2.61	2.31	2.61	2.31	2.61	2.31	2.31	2.31	2.31	2.31	2.31	2.31
Seattle	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Toledo	2.36	2.20	2.40	2.20	2.40	2.20	2.40	2.20	2.40	2.20	2.40	2.20

City	July		August		September		October		November		December	
	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925	1926
Atlanta	$2.40	$2.35	$2.40	$2.35	$2.25	$2.35	$2.25	$2.35	$2.25	$2.35	$2.35	$2.35
Baltimore	2.50	2.35	2.50	2.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Birmingham	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Boston	2.50	2.35	2.45	2.30	2.45	2.30	2.40	2.30	2.40	2.30	2.40	2.25
Cedar Rapids	2.44	2.34	2.44	2.34	2.44	2.34	2.44	2.34	2.34	2.34	2.34	2.34
Chicago	2.20	2.10	2.20	2.10	2.20	2.10	2.20	2.10	2.10	2.10	2.10	2.10
Cincinnati	2.47	2.37	2.47	2.37	2.47	2.37	2.47	2.37	2.37	2.37	2.37	2.37
Cleveland	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.29	2.29	2.29	2.29
Dallas	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Davenport	2.39	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.29	2.29	2.29	2.29
Denver	2.84	2.85	2.84	2.85	2.84	2.85	2.84	2.85	2.84	2.85	2.84	2.85
Detroit	2.35	2.15	2.35	2.15	2.35	2.15	2.35	2.15	2.15	2.15	2.15	2.15
Duluth	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.09	2.09	2.09	2.09
Indianapolis	2.41	2.29	2.39	2.29	2.39	2.29	2.39	2.29	2.29	2.29	2.29	2.29
Jersey City	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Kansas City	2.20	2.35	2.30	2.02	2.30	2.35	2.30	2.35	2.30	2.35	2.30	2.35
Los Angeles	2.52	2.30	2.52	2.30	2.52	2.36	2.52	2.36	2.52	2.20	2.52	2.50
Milwaukee	2.35	2.25	2.35	2.25	2.35	2.25	2.35	2.25	2.25	2.25	2.25	2.25
Minneapolis	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.32	2.32	2.32	2.32
Montreal	1.80	1.15	1.80	1.15	1.80	1.15	1.80	1.15	1.80	1.15	1.80	1.15
New Orleans	2.40	2.30	2.40	2.30	2.40	2.30	2.40	2.30	2.40	2.30	2.40	2.40
New York (delivered)	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.70	2.50–2.60
New York (alongside dock to dealers)	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Peoria	2.37	2.27	2.37	2.27	2.37	2.27	2.37	2.27	2.27	2.27	2.27	2.27
Philadelphia	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.50
Pittsburgh	2.19	2.09	2.19	2.09	2.19	2.09	2.19	2.09	2.09	2.09	2.09	2.09
St. Louis	2.30	2.20	2.30	2.20	2.30	2.20	2.30	2.20	2.20	2.20	2.20	2.20
St. Paul	2.42	2.32	2.42	2.32	2.42	2.32	2.42	2.32	2.32	2.32	2.32	2.32
San Francisco	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31
Seattle	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Toledo	2.40	2.20	2.40	2.20	2.40	2.20	2.40	2.20	2.20	2.20	2.20	2.20

[1] Engineering News-Record. Prices quoted are f. o. b. points listed, without bags; cash discount not deducted.

Comparative prices of building materials in December, 1925 and 1926 [1]

[Percentage of increase over prices in 1913]

	1925	1926
Building materials in general	77.0	72.7
Lime (lump), average, 15 plants	122.1	117.1
Plate glass, 3 to 5 feet, New York	69.0	60.5
Turpentine, New York	137.7	102.0
Brick, common, simple average at 82 brickyards	104.7	103.9
Linseed oil, New York	105.0	74.1
Douglas fir, No. 1, common, at mills	68.3	83.4
Yellow-pine flooring, B and better, at mills	116.3	79.3
Oak, plain white, No. 1, Cincinnati	78.4	81.1
Portland cement, simple average at 6 representative plants	68.4	66.9

[1] U. S. Department of Labor, Bureau of Labor Statistics, Wholesale Prices of Commodities, pp. 7-8 of report for December, 1926.

MANUFACTURING CONDITIONS

PLANTS

Portland cement was made at 140 plants in 1926 and at 138 plants in 1925. One plant that was formerly active produced no cement during 1926. Three new plants produced Portland cement in 1926. Two of these, like the six new plants in 1925, are reported as wet-process plants, while one is reported as semiwet process; at the end of 1926 they were equipped as follows:

Calaveras Cement Co., plant at San Andreas, Calaveras County, Calif. Wet process: Limestone and shale; clinker burned with oil; two 240-foot kilns; reported daily clinker capacity, 3,000 barrels.

Wabash Portland Cement Co., plant at Osborn, Greene County, Ohio. Semiwet process: Limestone and clay; clinker burned with coal; two 175-foot kilns; reported daily clinker capacity, about 2,400 barrels.

Lehigh Portland Cement Co., plant at Sandts Eddy, Northampton County, Pa. Wet process: Cement rock; clinker burned with coal; two 160-foot kilns; reported daily clinker capacity, 2,500 barrels.

Additional plants were under construction but not completed in 1926 in Alabama, California, Colorado, Florida, Iowa, Louisiana, New York, Pennsylvania, Tennessee, Texas, and West Virginia.

FUELS

The records show that 80.2 per cent of the Portland cement produced was burned with coal alone in 1926, as in 1925; 8.9 per cent of the production was burned with crude oil in 1926 and 9.9 per cent in 1925.

Portland cement burned by different fuels, 1925–26

Fuel	1925			1926		
	Number of plants	Barrels of cement	Percentage of total	Number of plants	Barrels of cement	Percentage of total
Coal	113	129,737,349	80.2	114	131,991,484	80.2
Coal and crude oil	1	11,241,669	7.0	1	13,934,776	8.5
Coal and natural gas	1			2		
Crude oil and natural gas	3			4		
Crude oil	16	15,992,161	9.9	15	14,644,157	8.9
Crude oil, coal, and natural gas	3	4,687,722	2.9	1	3,959,753	2.4
Natural gas	1			3		
	138	161,658,901	100.0	140	164,530,170	100.0

CAPACITY

No inquiry on commercial capacity was made of the manufacturers of Portland cement in 1926. Estimates have been made by the Bureau of Mines of capacity for the production of finished Portland cement of all plants in existence at the end of 1926. These estimates are based upon demonstrated rates of production sustained over continuous periods of three months by each of the 140 active plants and include the capacity of idle plants in stand-by condition as well as increased capacity due to extensions and improvements at old plants and approximately 3,500,000 barrels capacity for finished Portland cement of three new plants, one each in California, Ohio, and Pennsylvania, which began operating during the year. The total capacity thus indicated at the close of 1926 was at least 215,300,000 barrels, a gain of more than 20,000,000 barrels during the year. The total production for 1926 was 76.4 per cent of the indicated capacity at the close of the year. The corresponding figure for 1925 was 83.5 per cent.

PRODUCTION ACCORDING TO RAW MATERIALS

In the following table the production of Portland cement in the United States is classified according to the kinds of raw materials from which the cement is manufactured. The production is grouped as follows:

Type 1 includes cement produced from argillaceous limestone ("cement rock") or from a mixture of cement rock with pure limestone. Under this type of manufacture are included all the cement plants of the Lehigh district of Pennsylvania and New Jersey and a few plants in certain other States.

Type 2 includes cement made from a mixture of comparatively pure limestone with clay or shale. This mixture is employed at the majority of plants in the United States. In 1926 two plants reported the use of oyster shells and clay in their output, which is included in type 2 in order to avoid disclosure.

Type 3 includes cement manufactured from a mixture of marl and clay. This type of mixture has been used in certain plants in Michigan, Ohio, Indiana, New York, Utah, and Virginia, and in 1926 was used in all these States except New York.

Type 4 includes cement manufactured from a mixture of limestone and blast-furnace slag.

This table shows a decrease in 1926 compared with 1914 in the relative production from cement rock (type 1), from marl (type 3), and from slag (type 4), and the corresponding increase in the production from limestone (type 2).

Production and percentage of total output of Portland cement in the United States according to type of material used, 1898–1914 and 1926

Year	Type 1. Cement rock and pure limestone		Type 2. Limestone and clay or shale		Type 3. Marl and clay		Type 4. Blast-furnace slag and limestone	
	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage
1898	2,764,694	74.9	365,408	9.9	562,092	15.2		
1899	4,010,132	70.9	546,200	9.7	1,095,934	19.4		
1900	5,960,739	70.3	1,034,041	12.2	1,454,797	17.1	32,443	0.4
1901	8,503,500	66.9	2,042,209	16.1	2,001,200	15.7	164,316	1.3
1902	10,953,178	63.6	3,738,303	21.7	2,220,453	12.9	318,710	1.8
1903	12,493,694	55.9	6,333,403	28.3	3,052,946	13.7	462,930	2.1
1904	15,173,391	57.2	7,526,323	28.4	3,332,873	12.6	473,294	1.8
1905	18,454,902	52.4	11,172,389	31.7	3,884,178	11.0	1,735,343	4.9
1906	23,896,951	51.4	16,532,212	35.6	3,958,201	8.5	2,076,000	4.5
1907	25,859,095	53.0	17,190,697	35.2	3,606,598	7.4	2,129,000	4.4
1908	20,678,693	40.6	23,047,707	45.0	2,811,212	5.5	4,535,300	8.9
1909	24,274,047	37.3	32,219,365	49.6	2,711,219	4.2	5,786,800	8.9
1910	26,520,911	34.6	39,720,320	51.9	3,307,220	4.3	7,001,500	9.2
1911	26,812,129	34.1	40,665,332	51.8	3,314,176	4.2	7,737,000	9.9
1912	24,712,780	30.0	44,607,776	54.1	2,467,368	3.0	10,650,172	12.9
1913	29,333,490	31.8	47,831,863	51.9	3,734,778	4.1	11,197,000	12.2
1914	24,907,047	28.2	50,168,813	56.9	4,038,310	4.6	9,116,000	10.3
1926	44,090,657	26.8	[1] 101,637,866	61.8	3,324,408	2.0	15,477,239	9.4

[1] Includes output of 2 plants using oyster shells and clay.

The producers reported as entering into the 164,530,170 barrels, or 30,931,672 short tons, of Portland cement manufactured in the United States in 1926, approximately 51,617,000 short tons of raw materials, as follows: 41,583,000 tons of limestone and cement rock, 5,160,000 tons of clay and shale, 1,546,000 tons of blast-furnace slag, 1,276,000 tons of marl, 1,042,000 tons of gypsum, and 1,010,000 tons of other materials, such as oyster shells, sand, ashes, and caustic waste.

MASONRY, NATURAL, AND PUZZOLAN CEMENTS

The term "masonry cement" is used here to designate certain cements made, like natural cements, by grinding calcined calcareous rock, that are being used largely in mortar for laying brick and stone, although other hydraulic cements are also suitable for masonry.

Natural cement, including masonry cement, was produced in 1926 in 10 plants, situated as follows: Utica, Ill.; Speed, Ind.; Fort Scott, Kans.; Kosmosdale, Ky.; Austin and Mankato, Minn.; Brixment and Rosendale, N. Y.; Lisbon, Ohio; and Siegfried, Pa.

One manufacturer with a plant at Birmingham, Ala., reports an output of puzzolan or slag-lime cement, and in order that this output may be included in the cement totals for the United States without disclosure it is included with the statistics of masonry and natural cements.

The next table, which gives figures on the output of masonry, natural, and puzzolan cements in 1925 and 1926, indicates an increase in the shipments from the mills of 16 per cent in quantity and 11 per cent in gross value in 1926 as compared with 1925. Stocks at the mills also increased and were about 68 per cent higher at the end

of 1926 than at the end of 1925. The average factory value per barrel in 1926 was $1.39 as compared with $1.46 in 1925. The output has been expressed in terms of 376-pound barrels to correspond with the statistics for Portland cement. One new plant in New York began production of natural cement in 1926. There was reported by the producers as entering into the manufacture of masonry and natural cements in the United States in 1926 approximately 391,000 short tons of limestone ("cement rock").

The second table presents quoted wholesale prices of these cements in lots of 500 barrels or more, exclusive of bags, f. o. b. at a number of widely separated cities in the United States, as published by the Engineering News-Record; but in order to make a consistent comparison of these prices the reader should note that barrels of 240, 250, 260, 265, 300, 320, and 340 pounds are involved instead of the standard Portland cement barrel of 376 pounds. These cements are packed four sacks to the barrel, each sack holding about 1 cubic foot, as with Portland cement, but the lower specific gravity of the non-Portland cements accounts for their lighter weight per barrel.

Masonry, natural, and puzzolan cements produced, shipped, and in stock in the United States, 1925–26

Year	Production		Shipments		Stock (Dec. 31)
	Active plants	Barrels of 376 pounds	Barrels of 376 pounds	Value	Barrels of 376 pounds
1925	10	1,729,343	1,751,725	$2,551,583	107,459
1926	11	2,104,891	2,031,851	2,820,110	180,499

Wholesale prices of masonry, natural, and puzzolan cements, 1925–26, by months [1]

[Per barrel except as otherwise noted]

City and brand	January		February		March		April	
	1925	1926	1925	1926	1925	1926	1925	1926
Birmingham (Magnolia)	$2.25	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Boston (Rosendale)	2.50	2.65	2.50	2.65	2.50	2.65	2.50	2.65
Cincinnati (Utica)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
Kansas City (Fort Scott)	1.50	1.35	1.50	1.35	1.50	1.45	1.35	2.20
Minneapolis (Rosendale)	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
St. Louis (Carney)	2.35	2.50	2.35	2.35	2.35	2.35	2.35	2.35

City and brand	May		June		July		August	
	1925	1926	1925	1926	1925	1926	1925	1926
Birmingham (Magnolia)	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Boston (Rosendale)	2.50	2.60	2.50	2.60	2.50	2.60	2.50	2.60
Cincinnati (Utica)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
Kansas City (Fort Scott)	1.35	1.35	1.35	1.50	1.35	1.50	1.35	1.50
Minneapolis (Rosendale)	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
St. Louis (Carney)	2.35	2.35	2.35	2.85	2.30	2.35	2.30	2.35

[1] Engineering News-Record. Price to dealers per barrel for 500 barrels or more f. o. b., exclusive of bags.
[2] Available information indicates that the weights per barrel of these cements are as follows: Rosendale, 300 pounds; Utica, 265 pounds; Fort Scott, 240 pounds; Carney, 250 pounds; Magnolia (puzzolan cement), 320 pounds.

Wholesale prices of masonry, natural, and puzzolan cements, 1925–26, by months—Continued

City and brand	September		October		November		December	
	1925	1926	1925	1926	1925	1926	1925	1926
Birmingham (Magnolia)	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Boston (Rosendale)	2.75	2.60	2.75	2.65	2.75	2.65	2.75	2.65
Cincinnati (Utica)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
Kansas City (Fort Scott)	1.65	1.45	1.45	1.45	1.35	1.45	1.35	1.40
Minneapolis (Rosendale)	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
St. Louis (Carney)	2.35	2.35	2.35	2.25	2.50	2.35	2.50	2.35

IMPORTS AND EXPORTS[3]

IMPORTS

The quantities given in the following tables of imports include hydraulic cement of all kinds. Some of the cement imported evidently was not manufactured in the country from which it was shipped to the United States.

Imports of hydraulic cement into the United States in 1926—more than 3,232,000 barrels—show a decrease of 11.6 per cent, the only decrease recorded in any year since 1921. The imports received were approximately as follows: From Belgium, 2,407,000 barrels (nearly 75 per cent of the total imports); Denmark, 415,000 barrels; United Kingdom, 85,000 barrels; Estonia, 74,000 barrels; France, 74,000 barrels; Canada, 60,000 barrels; Norway, 47,000 barrels; Japan, 24,000 barrels; Soviet Russia in Europe, 21,000 barrels; and other countries, 25,000 barrels. The districts into which more than 300,000 barrels were imported in 1926 are, in order, Florida, Massachusetts, Philadelphia, and Porto Rico. The imports into Florida were, as in 1925, nearly 1,000,000 barrels. The average of the values assigned to the imports, which are supposed to represent the market values in the foreign countries from which the material is exported, including the cost of containers or coverings, was virtually the same in 1926 as in 1925—$1.59 a barrel.

The tariff act of 1922 put hydraulic cements on the free list, with the proviso that if any country imposes a duty on such cement coming from the United States an equal duty shall be imposed upon such cement coming into the United States from that country.

[3] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Roman, Portland, and other hydraulic cements imported into the United States, 1925–26, by countries

[General imports]

Country	1925		1926	
	Barrels	Value	Barrels	Value
Belgium	1,919,239	$2,994,338	2,407,220	$3,740,156
Canada	711,051	1,097,071	59,491	83,713
Cuba			441	1,484
Denmark	351,484	528,479	414,811	687,389
Estonia	33,690	82,830	74,254	161,208
Finland			1,197	2,309
France	12,451	21,960	73,729	105,157
Germany	16,961	17,412	9,199	10,804
Greece	(1)	3	(1)	5
Japan	10,193	16,250	24,092	44,825
Kwantung	30	35		
Netherlands			14,077	26,209
Norway	593,629	1,041,868	47,374	77,489
Soviet Russia in Europe			21,113	43,228
Sweden			30	322
United Kingdom	6,160	12,977	85,358	141,102
Virgin Islands of the United States	322	430		
West Indies ("Other British")	107	275		
	3,655,317	5,813,928	3,232,386	5,125,400

[1] Less than 1 ton; number of barrels not recorded.

Roman, Portland, and other hydraulic cements imported into the United States, 1925–26, by districts

[General imports]

District	1925		1926	
	Barrels	Value	Barrels	Value
Buffalo	60,319	$96,469	161	$602
Chicago	(1)	11		
Connecticut			8,448	13,479
Dakota	60	184		
Florida	973,017	1,641,983	977,915	1,577,594
Galveston			17,706	25,734
Hawaii	197,871	324,955	73,128	113,923
Los Angeles	370,130	552,874	46,391	76,640
Maine and New Hampshire	32,491	49,579	80,253	144,352
Maryland			250	465
Massachusetts	321,255	545,834	613,211	896,473
Michigan			54	77
Mobile	41,684	84,081	101,384	150,533
New Orleans	157,014	242,087	254,216	370,384
New York	15,853	27,999	74,402	168,362
Ohio	(1)	10		
Oregon	116,009	180,154	67,420	101,899
Philadelphia	282,365	391,191	430,372	709,459
Porto Rico	318,135	452,890	316,484	509,161
Rochester	9,258	11,068		
St. Lawrence	357,625	564,646	11,444	28,529
San Francisco	131,421	206,341	31,527	43,020
South Carolina	45,867	64,630	8,984	13,433
Vermont	54,380	80,113	1,513	2,969
Virginia	1,150	1,749		
Washington	169,413	295,080	117,123	177,312
	3,655,317	5,813,928	3,232,386	5,125,400

[1] Less than 1 ton; number of barrels not recorded.

Roman, Portland, and other hydraulic cements imported into the United States in 1926, by countries and districts

[General imports]

Country and district	Barrels	Value
Belgium:		
Connecticut	8,448	$13,479
Florida	683,772	1,095,059
Galveston	17,706	25,734
Hawaii	49,036	69,098
Los Angeles	36,180	45,618
Maine and New Hampshire	70,602	123,304
Massachusetts	526,763	780,717
Mobile	101,384	156,533
New Orleans	237,618	346,744
New York	4,397	8,838
Oregon	67,420	101,899
Philadelphia	430,324	709,403
Porto Rico	20,619	38,481
San Francisco	30,931	41,340
South Carolina	8,984	13,433
Washington	113,036	170,476
	2,407,220	3,740,156
Canada:		
Buffalo	161	602
Florida	45,807	54,285
Maine and New Hampshire	566	2,328
St. Lawrence	11,444	23,529
Vermont	1,513	2,969
	59,491	83,713
Cuba: Florida	441	1,484
Denmark:		
Florida	124,880	224,672
Massachusetts	22,084	30,979
New York	83	143
Porto Rico	265,381	428,239
Washington	2,383	3,356
	414,811	687,389
Estonia:		
Florida	49,596	90,499
New York	24,658	70,709
	74,254	161,208
Finland: New York	1,197	2,309
France:		
Massachusetts	53,110	$65,559
New Orleans	3,700	8,220
New York	16,323	29,698
San Francisco	596	1,680
	73,729	105,157
Germany:		
Los Angeles	304	723
Michigan	54	77
New Orleans	7,197	6,246
Porto Rico	1,054	2,350
Washington	590	1,408
	9,199	10,804
Greece: New York	[1]	5
Japan: Hawaii	24,092	44,825
Netherlands:		
Maine and New Hampshire	9,085	18,720
New Orleans	4,992	7,489
	14,077	26,209
Norway:		
Florida	38,354	63,033
Massachusetts	8,972	14,400
Philadelphia	48	56
	47,374	77,489
Soviet Russia in Europe: New York	21,113	43,228
Sweden: New York	30	322
United Kingdom:		
Florida	35,065	48,562
Los Angeles	9,907	30,299
Maryland	250	465
Massachusetts	2,282	4,818
New Orleans	709	1,685
New York	6,601	13,110
Porto Rico	29,430	40,091
Washington	1,114	2,072
	85,358	141,102
	3,232,386	5,125,400

[1] Less than 1 ton; number of barrels not recorded.

In addition to the imports in 1926 shown in the preceding tables there were also recorded as "imported for consumption" 11,837 barrels of "white nonstaining Portland cement," valued at $29,526. The source of these imports, by countries, is not recorded; the figures are included in those shown in the following table.

Hydraulic cement imported for consumption in the United States, 1917–1926

Year	Barrels [1]	Value	Year	Barrels [1]	Value
1917	2,323	$6,076	1922	355,931	$692,429
1918	305	1,200	1923	1,767,264	3,145,977
1919	8,931	52,636	1924	2,023,663	3,139,788
1920	524,604	1,254,729	1925	3,667,458	5,836,482
1921	122,317	388,842	1926	3,244,223	5,154,926

[1] Barrels of 376 pounds in 1920 to 1926 and 380 pounds in earlier years.

EXPORTS

In 1926 the hydraulic cement exported to foreign countries and to the Philippine Islands and the Virgin Islands of the United States, most of it Portland cement, decreased 4.4 per cent in quantity and 0.2 per cent in value as compared with 1925. The quantity exported in 1926 was, as in 1925, about 0.6 per cent of the total shipments of hydraulic cement from mills during the year. The average value at the ports of export was $3.07 a barrel, as compared with $2.95 in 1925.

The destinations of exports were approximately as follows: To South America, 481,000 barrels; Cuba, 134,000 barrels; other West Indies and Bermuda, 83,000 barrels; Mexico, 122,000 barrels; Central America, 81,000 barrels; Canada, 18,000 barrels; and other countries, 55,000 barrels. The export trade varies from year to year but has never reached large proportions. During recent years strong competition from manufacturers in Europe, where labor costs are much lower than in the United States, has restricted the foreign market for American cement.

Hydraulic cement exported from the United States, 1925–26, by countries

Country	1925		1926	
	Barrels	Value	Barrels	Value
North America:				
Canada	16,487	$69,760	17,746	$82,477
Central America—				
British Honduras	2	20	14	126
Costa Rica	2,203	8,039	1,776	6,334
Guatemala	3,438	10,126	3,152	10,710
Honduras	20,895	56,986	19,171	47,998
Nicaragua	2,616	9,439	2,331	6,308
Panama	60,983	159,111	49,211	143,582
Salvador	5,986	21,642	5,685	18,593
Mexico	136,957	390,493	121,546	363,145
Miquelon, Langley, and St. Pierre Islands	200	510		
Newfoundland and Labrador	1,960	5,515	14	81
West Indies—				
British—				
Barbados	12	82	6	36
Bermuda	1,155	3,483	7,241	18,191
Jamaica	14	103	41	232
Trinidad and Tobago	230	914	108	950
Other British	20,704	48,203	23,183	55,544
Cuba	334,863	791,651	134,495	323,328
Dominican Republic	26,216	64,304	8,920	26,511
Dutch	919	2,437	7,527	17,975
Haitian Republic	25,659	66,040	35,696	74,832
Virgin Islands of the United States	183	551	5	11
South America:				
Argentina	40,933	230,800	43,110	247,076
Bolivia	477	2,591	441	2,457
Brazil	12,893	73,249	12,557	71,719
Chile	4,400	19,831	32,159	86,491
Colombia	88,089	226,073	75,212	186,679
Ecuador	5,487	17,256	6,112	17,114
Guiana—				
British	121	804	41	258
Dutch	1,062	3,102	4,100	12,918
French	330	842	165	457
Peru	39,454	108,957	17,596	49,035
Uruguay	8,572	49,540	27,503	99,183
Venezuela	112,524	302,570	262,192	724,751
Europe:				
Azores and Madeira Islands			10	65
Belgium			1	6
Czechoslovakia	5	36		
Denmark	21	149	81	530
Finland	25	162		
France			2	27
Germany	1,258	3,240	1,375	7,514

Hydraulic cement exported from the United States, 1925–26, by countries—Contd.

Country	1925		1926	
	Barrels	Value	Barrels	Value
Europe—Continued.				
Greece	210	$1,209	235	$1,422
Irish Free State	201	1,156	155	578
Italy	10	59	300	1,779
Netherlands	12	47	328	2,199
Norway	327	2,079	283	1,945
Poland and Danzig	1	7	30	186
Portugal	20	54		
Spain	2,033	12,225	1,820	10,742
Sweden	7	43	30	195
United Kingdom	21,718	129,130	33,808	184,267
Asia:				
China	4,148	25,139	1,223	7,300
East Indies—				
British—				
Ceylon	415	2,969	100	590
India	2,173	13,494	1,992	11,780
Malaya	1,703	10,412	2,743	16,562
Dutch—				
Java and Madura	575	3,210	628	3,441
Other Dutch			5	25
Hong Kong	375	2,225	307	1,923
Japan [1]	47	424	[1] 415	[1] 3,525
Palestine and Syria	1,547	9,061	775	4,582
Philippine Islands	366	2,545	370	3,002
Siam	50	317	25	160
Africa:				
British—				
East	19	57	300	2,244
South	81	405	240	1,513
West			96	257
Canary Islands			10	64
Egypt			10	60
Italian			8	24
Liberia	25	61		
Portuguese—Other	33	107	164	968
Oceania:				
British—				
Australia	3,685	22,833	5,111	29,361
New Zealand	2,257	14,027	1,937	10,396
Other British	125	402	70	224
French			133	294
Other	110	220		
	1,019,597	3,003,128	974,326	2,995,833

[1] Chosen included with Japan for 1926.

Domestic hydraulic cement shipped to Alaska, Hawaii, and Porto Rico, 1925–26

	1925		1926	
	Barrels	Value	Barrels	Value
Alaska	15,552	$49,611	19,003	$59,198
Hawaii	37,795	85,901	189,885	431,279
Porto Rico	122,516	285,354	82,020	194,491
	175,863	420,866	290,908	684,968

Hydraulic cement exported from the United States, 1917–1926

Year	Barrels	Value	Percentage of total shipments from mills	Year	Barrels	Value	Percentage of total shipments from mills
1917	2,586,215	$5,328,536	2.8	1922	1,127,845	$3,206,201	1.0
1918	2,252,446	5,912,166	3.2	1923	1,001,688	2,944,174	.7
1919	2,463,573	7,513,389	2.9	1924	878,543	2,615,154	.6
1920	2,985,807	10,045,369	3.1	1925	1,019,597	3,003,128	.6
1921	1,181,014	4,276,986	1.2	1926	974,326	2,995,833	.6

CEMENT PRODUCTION IN CANADA

According to the Dominion Bureau of Statistics the total mill output of Portland cement in Canada in 1926 was 9,041,411 barrels. The shipments amounted to 8,707,021 barrels, valued at $13,013,283, compared with 8,116,597 barrels, valued at $14,046,704, in 1925—an increase of 7 per cent in quantity and a decrease of 7 per cent in value. The average selling price over the whole Dominion, computed from the total quantity sold and the total value as given, was $1.49 a barrel in 1926 and $1.73 a barrel in 1925.

The apparent consumption of cement in Canada in 1926 showed an increase of more than 18 per cent over that in 1925. Imports in 1926 amounted to 21,114 barrels, having an average value of $3.69 a barrel, as compared with an average of $2.89 a barrel in 1925. Exports of Portland cement amounted to 285,932 barrels, with an invoiced value of $358,231.

Summary statistics of the cement industry in Canada, 1925–26 [1]

	1925		1926	
	Barrels	Value	Barrels	Value
Output	7,869,946	----------	9,041,411	----------
Sold or used	8,116,597	$14,046,704	8,707,021	$13,013,283
Stocks, Dec. 31	1,274,923	----------	1,609,313	----------
Imports:				
Portland	21,849	63,067	21,114	77,866
Manufactures	----------	13,753	----------	18,813
Exports	997,915	1,498,495	285,932	358,231
Apparent consumption	7,140,531	----------	8,442,203	----------

[1] Dominion Bureau of Statistics.

Cement is produced in Quebec, Ontario, Manitoba, Alberta, and British Columbia. Formerly puzzolan cement was made from blast-furnace slag in Nova Scotia, but in recent years manufacture has been discontinued.

The average selling price a barrel f. o. b. plant, by Provinces, was as follows: Quebec, $1.22; Ontario, $1.41; Manitoba, $2.57; Alberta, $2.06; and British Columbia, $2.27.

The following table shows sales from mills in 1925 and 1926, by Provinces:

Cement sold by Canadian mills, 1925–26, by Provinces [1]

Province	1925		1926	
	Barrels	Value	Barrels	Value
Quebec	3,365,802	$5,689,991	3,727,377	$4,535,386
Ontario	3,462,358	5,253,911	3,398,860	4,792,857
Manitoba	407,395	1,037,929	612,155	1,572,401
Alberta	395,857	913,529	423,766	873,621
British Columbia	485,185	1,151,344	544,863	1,239,018
Canada	8,116,597	14,046,704	8,707,021	13,013,283

[1] Dominion Bureau of Statistics.

PETROLEUM

By G. R. Hopkins and A. B. Coons [1]

SUMMARY

The production of crude petroleum in the United States in 1926 amounted to 770,874,000 barrels, a new high figure and an increase over 1925 of 7,131,000 barrels, or nearly 1 per cent. This increase in production in 1926 was somewhat surprising, as the cumulative output over most of the year was considerably behind the record of 1925, with no new fields of consequence in sight; but the rapid development of the Seminole field completely changed the situation. Production and stocks increased and prices, which had been at a comparatively high level, were materially reduced.

The world's production of crude petroleum totaled 1,098,389,000 barrels, a record figure, representing an increase of 29,427,000 barrels over 1925. Of this world total the United States produced 70.2 per cent, as compared with 71.4 per cent in 1925. Exclusive of the United States, Venezuela, Russia, and Rumania recorded the largest actual increases in production, although Colombia showed the largest percentage increase. Despite another drop of approximately 25,000,000 barrels, Mexico continued to hold second rank among the nations.

A comparison of the total production, by districts, reveals the surprising fact that the increase of 1926 over 1925 was not due to an increase in the Mid-Continent or California fields, which together produced 84 per cent of the total output, but chiefly to an increase in the output of the Gulf coast area. Production continued to increase in the Appalachian area where success in the use of new recovery methods served as a general stimulating influence. The decline in the output of the Rocky Mountain area was checked, although production in the leading State, Wyoming, declined.

As far as individual fields are concerned, the discovery and development of the Seminole field in Seminole County, Okla., was the most important event of the year. The Panhandle field, while perhaps not as spectacular as Seminole in the size of wells, far exceeded expectations and was the largest single factor in the increase in total production. The development of the deep-sand zones at Spindletop was the most important event in the coastal area. The Balcones fault zone of Texas was a disappointment, as only one small field—Nigger Creek—was discovered there in 1926. West Texas was again the scene of much exploratory work, with the result that

[1] The tables in this report were prepared, unless otherwise indicated, by Misses A. B. Coons, M. N. Schellenger, and A. L. Clapp, and Mrs. C. S. Evans, of the Bureau of Mines. Figures on imports and exports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

several important fields were discovered. In the northern Louisiana-Arkansas area nothing of great importance occurred to compensate for the decline at Smackover, although the shallow Urania pool promised for a time to become a major factor. The Sunburst field led in the Rocky Mountain area; its increased output more than balanced the decline in Salt Creek. The outstanding feature of the year in California was the discovery of the Seal Beach field, although the increases in output from the Ventura Avenue and Huntington Beach fields were more important as regards production.

Imports of crude petroleum into the United States in 1926 amounted to approximately 60,400,000 barrels, valued at a little over $79,000,000. These figures represent a slight decrease in quantity but an increase in value, as compared with 1925. Exports of crude oil in 1926 totaled approximately 15,400,000 barrels, a moderate increase over the preceding year. Receipts from Venezuela showed a large increase; this increase was the largest single factor in compensating for the decline in imports from Mexico. Upon the completion of a pipe line from the producing fields to the coast in July, 1926, for the first time Colombia exported crude oil, practically all of which was shipped to the United States.

An increase in the demand for refined products in excess of the increase in crude production resulted in material withdrawals from crude stocks in 1926. The grand total of all classes of crude stocks on December 31, 1926, amounted to 402,299,000 barrels as compared with 431,646,000 barrels on hand the previous year, indicating a withdrawal from stocks of close to 30,000,000 barrels. This figure, however, includes almost 8,000,000 barrels lost by fire in California. Pipe-line and tank-farm stocks in the Mid-Continent field and stocks of refinable crude in California showed the largest decreases, due undoubtedly to the heavy demand by refineries for crude oil of high gasoline content.

The consumption of crude petroleum, as measured by refinery runs to stills, established a new high figure of 779,264,000 barrels, an increase of 5 per cent over 1925. Of the total, 44,963,000 barrels, or 6 per cent, was foreign crude petroleum. In addition, considerable crude oil was burned as fuel, but unfortunately complete data are not available.

In 1926, as in 1925 and 1924, prices in general were higher than for the preceding year. The total production in 1926 was valued at the wells at $1,447,760,000, or an average per barrel of $1.88, which was an increase of 20 cents over the previous year. With the exception of the State of Montana and the majority of States in the Appalachian and Gulf coast fields, all the producing districts and States reported a higher value per barrel at the well. In general, posted prices advanced as usual in the early spring, were highest in May, but from then on fell off. This advance and decline in prices may be explained by the fact that until the Seminole field was actively exploited during the last half of the year, thereby flooding the market, production ran considerably behind the 1925 record and was insufficient to satisfy the consumers' demand.

On December 31, 1926, there were in the United States 318,600 producing oil wells, a gain of 12,500 over 1925, representing an unusually large increase in the number of wells. This gain was probably due indirectly to higher prices which kept the number of aban-

donments at a low level and tended toward the restoration of some wells previously considered as junked. In 1926 there were 29,319 wells completed, compared with 25,623 in 1925, a gain of 14 per cent. This record has been surpassed only once—in 1920. Of the wells completed during 1926, 19,013, or 65 per cent, were oil wells, 2,341, or 8 per cent, gas wells, and the remainder, 7,965, or 27 per cent, dry holes, indicating a slight increase in the percentage of failures over 1925.

Condensed summary of statistics of crude petroleum, 1922–1926

	1922	1923	1924	1925	1926
Domestic production.....thousands of barrels [1]	557,531	732,407	713,940	763,743	770,874
Imports.....do	127,308	82,015	77,775	61,824	60,382
	684,839	814,422	791,715	825,567	831,256
Indicated domestic demand [2].....do	592,432	714,862	748,462	[3] 726,434	[3] 779,881
Exports (including foreign crude oil).....do	10,163	17,385	17,973	13,335	15,407
Added to stocks [4].....do	82,244	82,175	25,280	[3] 30,120	[3] [5] 24,764
	684,839	814,422	791,715	([6])	([6])
Runs to refinery stills.....do	500,706	581,238	643,719	739,920	779,264
World's production.....do	858,898	1,015,735	1,014,324	1,058,962	1,098,389
United States percentage of world's production	65	72	70	71	70
Total value of domestic production at wells.....thousands of dollars	895,111	978,430	1,022,683	1,284,960	1,447,760
Average price per barrel at wells	$1.61	$1.34	$1.43	$1.68	$1.88
Total number of producing oil wells in the United States, Dec. 31	284,880	290,100	299,100	306,100	318,600
Total number of oil wells completed in the United States during year	17,333	16,206	14,587	16,559	19,013

[1] 42 United States gallons.
[2] 1922: Deliveries to domestic consumers; 1923–1926: Domestic consumption.
[3] Includes all petroleum products, natural-gas gasoline, and benzol; corresponding totals for 1924 are: Domestic demand, 663,473,000 barrels; added to stocks, 28,081,000 barrels.
[4] 1922: Producers', pipe-line, and tank-farm stocks of domestic petroleum and stocks of foreign petroleum held in the United States by importers; 1923–24: Producers', pipe-line, tank-farm, and refinery stocks of domestic and foreign petroleum (topped oil topped in Mexico not included in 1924); 1925–26: All refined products and natural-gas gasoline included.
[5] Decrease.
[6] Figures not available.

Summary of supply and demand of all oils (including wax, coke, and asphalt), 1925–26, by months

[Thousands of barrels of 42 U. S. gallons]

	January	February	March	April	May	June	July	August	September	October	November	December	The year
1925													
Supply:													
Domestic production—													
Crude petroleum—													
Light	53,802	48,571	53,597	51,914	53,367	51,915	52,138	52,198	51,559	51,763	49,921	49,622	620,367
Heavy	6,598	6,204	7,742	10,134	15,483	15,325	15,625	15,382	13,873	13,079	12,006	11,925	143,376
Total crude	60,400	54,775	61,339	62,048	68,850	67,240	67,763	67,580	65,432	64,842	61,927	61,547	763,743
Natural-gas gasoline	2,103	1,900	2,103	2,036	2,103	2,036	2,162	2,207	2,216	2,431	2,448	2,562	26,307
Benzol	155	145	155	150	155	155	148	148	148	155	167	176	1,857
Total production	62,658	56,820	63,597	64,234	71,108	69,431	70,073	69,935	67,796	67,428	64,542	64,285	791,907
Daily average	2,021	2,029	2,052	2,141	2,294	2,314	2,260	2,256	2,260	2,175	2,151	2,074	2,170
Imports—													
Crude	7,025	5,579	6,375	5,482	6,484	5,153	4,155	4,045	4,027	4,367	4,891	4,241	61,824
Refined	1,405	1,712	1,667	1,475	1,532	2,074	1,700	1,292	877	951	919	772	16,376
Total new supply all oils	71,088	64,111	71,639	71,191	79,124	76,658	75,928	75,272	72,700	72,746	70,352	69,298	870,107
Daily average	2,293	2,290	2,311	2,373	2,552	2,555	2,449	2,428	2,423	2,347	2,345	2,235	2,384
Change in stocks all oils	5,519	6,216	6,059	4,299	9,790	5,537	1,256	[1] 388	437	[1] 1,615	[1] 1,473	[1] 5,517	30,120
Demand:													
Total demand	65,569	57,895	65,580	66,892	69,334	71,121	74,672	75,660	72,263	74,361	71,825	74,815	839,987
Daily average	2,115	2,068	2,115	2,230	2,237	2,371	2,409	2,441	2,409	2,399	2,394	2,413	2,301
Exports [2]—													
Crude	1,149	1,122	1,058	798	1,356	1,255	1,302	1,465	923	1,292	740	877	13,337
Refined	7,546	7,154	9,095	8,409	8,363	8,654	8,289	8,428	7,372	8,521	8,769	9,616	100,216
Domestic demand [3]	56,874	49,619	55,427	57,685	59,615	61,212	65,081	65,767	63,968	64,548	62,316	64,322	726,434
Daily average	1,835	1,772	1,788	1,923	1,923	2,040	2,099	2,122	2,132	2,082	2,077	2,075	1,990
Excess daily average domestic production over domestic demand	186	257	264	218	371	274	161	134	128	93	74	[4] 1	180
Stocks (end of month):													
Crude—													
East of California [5]	311,019	310,326	308,729	308,934	311,947	310,694	308,231	303,291	301,156	298,193	296,904	{291,809 [6]293,852}	-------
California—													
Light	41,914	42,450	43,422	44,040	44,600	44,058	43,411	41,566	43,007	44,059	44,561	44,451	-------
Heavy [7]	58,112	59,279	60,299	62,565	65,481	68,337	72,388	78,507	81,476	83,391	84,373	{84,983 [6]85,783}	-------
Total crude stocks	411,045	412,055	412,450	415,539	422,028	423,089	424,030	423,364	425,639	425,643	425,838	{421,243 [6]424,086}	-------
Natural-gas gasoline at plants	309	316	323	330	337	345	286	307	288	352	310	326	-------
Total refined	106,063	111,262	116,919	118,122	121,416	125,884	126,258	126,515	124,696	123,013	121,387	120,449	-------
Grand total stocks all oils	517,417	523,633	529,692	533,991	543,781	549,318	550,574	550,186	550,623	549,008	547,535	{542,018 [6]544,861}	-------
Bunker oil	3,508	3,248	3,371	3,735	3,995	3,720	3,740	3,355	3,736	3,069	3,788	3,562	42,827

1926													
Supply:													
Domestic production—													
Crude petroleum—													
Light	49,039	44,892	50,027	49,562	51,710	51,068	53,501	54,558	54,007	57,422	57,720	60,220	633,726
Heavy	10,942	10,000	10,853	10,809	11,112	10,721	11,667	12,451	11,775	12,242	12,171	12,405	137,148
Total crude	59,981	54,892	60,880	60,371	62,822	61,789	65,168	67,009	65,782	69,664	69,891	72,625	770,874
Natural-gas gasoline	2,524	2,381	2,693	2,609	2,626	2,548	2,629	2,664	2,657	2,907	2,967	3,100	32,305
Benzol	181	166	179	171	176	171	179	179	174	181	179	176	2,112
Total production	62,686	57,439	63,752	63,151	65,624	64,508	67,976	69,852	68,613	72,752	73,037	75,901	805,291
Daily average	2,022	2,051	2,057	2,105	2,117	2,150	2,193	2,253	2,287	2,347	2,435	2,448	2,206
Imports—													
Crude	4,688	3,743	7,216	5,906	4,501	5,571	5,185	5,332	4,350	3,860	5,043	4,987	60,382
Refined	1,251	2,001	1,522	1,616	2,017	2,344	1,992	2,361	1,132	1,765	1,619	1,318	20,938
Total new supply all oils	68,625	63,183	72,490	70,673	72,142	72,423	75,153	77,545	74,095	78,377	79,699	82,206	886,611
Daily average	2,214	2,257	2,338	2,356	2,327	2,414	2,424	2,501	2,470	2,528	2,657	2,652	2,429
Change in stocks all oils	[1] 1,237	217	1,711	[18] 11,003	[1] 2,594	[1] 4,782	[1] 2,667	[1] 5,885	[1] 3,004	5	921	3,554	[1] 24,764
Demand:													
Total demand	69,862	62,966	70,779	81,676	74,736	77,205	77,820	83,430	77,099	78,372	78,778	78,652	911,375
Daily average	2,254	2,249	2,283	2,723	2,411	2,574	2,510	2,691	2,570	2,528	2,626	2,537	2,497
Exports[2]—													
Crude	1,183	1,049	965	1,308	1,842	1,226	1,726	1,083	1,388	1,010	1,344	1,283	15,407
Refined	9,742	8,999	8,276	10,688	9,816	9,960	8,762	10,709	9,306	7,630	11,964	10,235	116,087
Domestic demand [3]	58,937	52,918	61,538	69,680	63,078	66,019	67,332	71,638	66,405	69,732	65,470	67,134	779,881
Daily average	1,901	1,890	1,985	2,323	2,035	2,201	2,172	2,311	2,214	2,249	2,182	2,166	2,137
Excess daily average domestic production over domestic demand	121	161	72	[4] 218	82	[4] 51	21	[4] 58	73	98	253	282	69
Stocks (end of month):													
Crude—													
East of California[5]—													
Light	291,628	230,730	228,161	226,737	224,669	221,665	221,535	220,240	220,103	222,137	223,828	225,404	
Heavy		58,186	60,030	59,673	59,517	59,402	57,137	57,719	57,885	53,310	53,321	52,860	
California—													
Light	44,197	44,871	43,973	[8] 38,634	37,192	35,454	33,548	32,149	30,494	30,390	30,051	30,861	
Heavy [7]	86,614	86,744	88,466	[8] 85,656	88,184	87,364	88,092	87,772	87,353	87,529	87,440	87,270	
Total crude stocks	422,439	420,531	420,630	[8] 410,700	409,562	403,885	400,312	397,880	395,835	395,366	394,640	396,395	
Natural-gas gasoline at plants	405	419	490	507	588	650	631	590	493	488	462	455	
Total refined	120,780	122,891	124,432	[8] 123,342	121,805	122,638	123,563	120,151	119,289	119,768	121,441	123,247	
Grand total stocks all oils	543,624	543,841	545,552	[8] 534,549	531,955	527,173	524,506	518,621	515,617	515,622	516,543	520,097	
Bunker oil	3,746	3,232	3,402	4,060	3,729	4,038	3,940	4,126	4,040	4,330	3,953	4,066	46,662

[1] Decrease.
[2] Includes shipments to noncontiguous Territories.
[3] Inclusive of bunker oil (shown below) put on vessels engaged in foreign trade.
[4] Deficiency.
[5] Exclusive of producers' stocks.
[6] Stocks east of California revised to include 2,043,000 barrels of crude in coastwise transit and stocks in California revised to include 800,000 barrels working stocks not previously reported—for comparison with 1926 figures.
[7] Includes fuel oil.
[8] Fire loss 4,600,000 barrels light crude, 3,204,000 barrels heavy crude, and 410,000 barrels various refined products—total 8,214,000 barrels.

PRODUCTION

DOMESTIC PRODUCTION

BY MONTHS

Contrary to the general rule, the production of crude petroleum in 1926 increased steadily throughout the year and was at its peak when the year closed. For the first time since monthly statistics of production have been compiled the daily average for each month in 1926 was an increase over the previous month. The record month for production was December, when 72,625,000 barrels of crude petroleum was produced, a daily average of 2,343,000 barrels. The production for the 11 months prior to December in 1926 was less than for the corresponding period in 1925, indicating that had the Seminole field not been discovered the total output of 1926 would have been considerably less than that of 1925.

Petroleum produced in the United States, 1922–1926, by months, in thousands of barrels

Year	January	February	March	April	May	June	July	August	September	October	November	December	The year
1922	43,696	41,314	47,188	45,167	47,002	46,087	47,134	47,059	45,805	48,410	48,027	50,642	557,531
1923	52,527	48,588	56,969	59,008	62,377	62,845	65,925	66,422	65,306	67,506	65,388	59,546	732,407
1924	57,273	55,889	60,141	59,830	61,834	59,583	61,932	62,398	60,376	60,469	56,782	57,433	713,940
1925	60,400	54,775	61,339	62,048	68,850	67,240	67,763	67,580	65,432	64,842	61,927	61,547	763,743
1926	59,981	54,892	60,880	60,371	62,822	61,789	65,168	67,009	65,782	69,664	69,891	72,625	770,874

BY FIELDS

In 1926 production in the two leading districts of the country—the Mid-Continent area and California—showed comparatively little change. The record output for the country, therefore, resulted mainly from increases in the coastal fields and in the Rocky Mountain States and to a continued comeback on the part of the old Appalachian district.

Petroleum produced in the United States, 1925–26, by fields

[Thousands of barrels of 42 U. S. gallons]

Field	January	February	March	April	May	June	July	August
1925								
Appalachian	2,198	2,099	2,342	2,350	2,294	2,379	2,417	2,333
Lima-Indiana	166	165	183	190	182	198	193	182
Illinois and southwestern Indiana	718	657	778	644	715	723	749	698
Mid-Continent	33,533	30,267	33,431	34,880	40,408	38,758	37,716	37,158
Gulf coast [1]	2,145	1,980	2,795	2,872	3,255	2,930	3,112	2,895
Rocky Mountain	2,635	2,502	2,916	2,889	2,879	2,800	3,056	3,190
California [2]	19,004	17,104	18,893	18,222	19,116	19,451	20,519	21,123
Other [3]	1	1	1	1	1	1	1	1
	60,400	54,775	61,339	62,048	68,850	67,240	67,763	67,580
1926								
Appalachian	2,162	2,126	2,386	2,375	2,358	2,451	2,491	2,460
Lima-Indiana	157	158	179	171	176	195	183	174
Michigan	2	1	2	3	3	3	4	7
Illinois and southwestern Indiana	689	655	779	633	707	718	736	724
Mid-Continent	31,911	29,049	32,453	33,090	34,643	34,244	35,844	36,604
Gulf coast [1]	2,832	2,694	2,758	2,757	2,816	2,632	3,645	4,872
Rocky Mountain [4]	3,181	3,034	3,497	3,286	3,403	3,270	3,475	3,263
California [2]	19,047	17,175	18,826	18,056	18,716	18,276	18,790	18,905
	59,981	54,892	60,880	60,371	62,822	61,789	65,168	67,009

[1] Salt-dome pools.
[2] Annual and semiannual figures from California State Mining Bureau. Monthly figures prorated on basis of monthly reports by the American Petroleum Institute.
[3] Alaska and Michigan.
[4] Includes Alaska.

Petroleum produced in the United States, 1925–26, by fields—Continued

[Thousands of barrels of 42 U. S. gallons]

Field	September	October	November	December	The year		
					Quantity	Value at wells	
						Total (thousands of dollars)	Average per barrel
1925							
Appalachian	2,346	2,380	2,193	2,279	27,610	85,440	$3.09
Lima-Indiana	179	173	152	157	2,120	4,580	2.16
Illinois and southwestern Indiana	721	731	688	690	8,512	16,480	1.94
Mid-Continent	35,818	35,237	33,861	33,264	424,331	732,930	1.73
Gulf coast [1]	2,878	2,903	2,677	2,670	33,112	53,360	1.61
Rocky Mountain	3,211	3,260	3,163	3,053	35,554	61,516	1.73
California [2]	20,278	20,157	19,192	19,433	232,492	330,610	1.42
Other [3]	1	1	1	1	12	44	3.67
	65,432	64,842	61,927	61,547	763,743	1,284,960	1.68
1926							
Appalachian	2,450	2,485	2,381	2,447	28,572	89,820	3.14
Lima-Indiana	169	166	146	156	2,030	4,710	2.32
Michigan	8	15	20	26	94	253	2.69
Illinois and southwestern Indiana	711	704	672	690	8,418	18,660	2.22
Mid-Continent	36,207	39,351	39,536	40,935	423,867	851,600	2.01
Gulf coast [1]	4,911	4,896	5,088	5,374	45,275	67,600	1.49
Rocky Mountain [4]	3,108	3,027	2,799	2,602	37,945	69,570	1.83
California [2]	18,218	19,020	19,249	20,395	224,673	345,547	1.54
	65,782	69,664	69,891	72,625	770,874	1,447,760	1.88

[1] Salt-dome pools.
[2] Annual and semiannual figures from California State Mining Bureau. Monthly figures prorated on basis of monthly reports by the American Petroleum Institute.
[3] Alaska and Michigan.
[4] Includes Alaska.

BY STATES

The chief petroleum-producing States in 1926, as in 1925, were, in the order named, California, Oklahoma, Texas, and Arkansas. These four States produced 82 per cent of the total output of the country in 1926. Only one change in rank in the 10 most important producing States was recorded in 1926—Montana, which in 1925 was thirteenth on the list, displaced Ohio, the tenth ranking State in 1925.

Petroleum produced in the United

[Thousands of barrels

Year	New York	Pennsylvania	Ohio	West Virginia	California	Kentucky	Tennessee	Colorado	Indiana	Illinois	Kansas
1859–1875	(2)	[2] 74,072									
1876	(2)	[2] 8,969	32	120	12						
1877	(2)	[2] 13,135	30	172	13						
1878	(2)	[2] 15,164	38	180	15						
1879	(2)	[2] 19,685	29	180	20						
1880	(2)	[2] 26,028	39	179	40						
1881	(2)	[2] 27,376	34	151	100						
1882	6,685	23,368	40	128	129						
1883	4,004	19,125	47	126	143	[3] 5	(3)				
1884	3,231	20,541	90	90	262	[3] 4	(3)				
1885	2,658	18,118	662	91	325	[3] 5	(3)				
1886	2,151	23,647	1,783	102	377	[3] 5	(3)				
1887	2,075	20,281	5,023	145	678	[3] 5	(3)	76			
1888	(2)	[2] 16,489	10,011	119	690	[3] 5	(3)	298			
1889	1,897	19,591	12,472	544	303	[3] 5	(3)	317	33	1	1
1890	(2)	[2] 28,458	16,125	493	307	[3] 6	(3)	369	64	1	1
1891	1,585	31,424	17,740	2,406	324	[3] 9	(3)	666	137	1	1
1892	1,273	27,149	16,363	3,810	385	[3] 7	(3)	824	698	1	5
1893	1,032	19,283	16,249	8,446	470	[3] 3	(3)	594	2,335	1	18
1894	942	18,078	16,792	8,577	706	[3] 2	(3)	516	3,689	(4)	40
1895	913	18,231	19,545	8,120	1,209	[3] 2	(3)	438	4,386	(4)	44
1896	1,205	19,379	23,941	10,020	1,253	[3] 2	(3)	361	4,681	(4)	114
1897	1,279	17,983	21,561	13,090	1,903	([3] 4)	(3)	385	4,122	1	81
1898	1,205	14,743	18,739	13,615	2,257	[3] 6	(3)	444	3,731	(4)	72
1899	1,321	13,054	21,142	13,911	2,642	[3] 18	(3)	390	3,848	(4)	70
1900	1,301	13,258	22,363	16,196	4,325	[3] 62	(3)	317	4,874	(4)	75
1901	1,207	12,625	21,648	14,177	8,787	[3] 137	(3)	461	5,757	(4)	179
1902	1,120	12,064	21,014	13,513	13,984	[3] 185	(3)	397	7,481	(4)	332
1903	1,163	11,355	20,480	12,900	24,382	[3] 554	(3)	484	9,186		932
1904	1,113	11,126	18,877	12,645	29,649	[3] 998	(3)	501	11,339		4,251
1905	1,118	10,437	16,347	11,578	33,428	[3] 1,217	(3)	376	10,964	181	[6] 12,014
1906	1,243	10,257	14,788	10,121	33,099	[3] 1,214	(3)	328	7,674	4,397	[6] 21,718
1907	1,212	10,000	12,207	9,095	39,748	[3] 821	(3)	332	5,128	24,282	2,410
1908	1,160	9,424	10,859	9,523	44,855	728		380	3,283	33,686	1,801
1909	1,135	9,299	10,633	10,745	55,472	639		311	2,296	30,898	1,264
1910	1,054	8,795	9,916	11,753	73,011	469		240	2,160	33,143	1,128
1911	953	8,248	8,817	9,796	81,134	472		227	1,695	31,317	1,279
1912	874	7,838	8,969	12,129	87,269	484		206	970	28,602	1,593
1913	948	7,917	8,781	11,567	97,788	525		189	956	23,894	2,375
1914	939	8,170	8,536	9,680	99,775	503		223	1,336	21,920	3,104
1915	888	7,838	7,825	9,265	86,592	437		208	876	19,042	2,823
1916	874	7,593	7,744	8,731	90,952	1,202	1	197	769	17,714	8,738
1917	880	7,733	7,751	8,379	93,878	3,088	12	121	760	15,777	36,536
1918	809	7,408	7,285	7,867	97,532	4,368	8	143	878	13,366	45,451
1919	851	8,137	7,736	8,327	101,183	9,278	15	121	972	11,960	33,048
1920	906	7,438	7,400	8,249	103,377	8,738	14	111	945	10,774	39,005
1921	988	7,418	7,335	7,822	112,600	9,013	12	108	1,158	10,043	36,456
1922	1,000	7,425	6,781	7,021	138,468	8,973	10	97	1,087	9,383	31,766
1923	1,250	7,609	7,085	6,358	262,876	8,069	8	86	1,043	8,707	28,250
1924	1,440	7,486	6,811	5,920	228,933	7,407	10	445	935	8,081	28,836
1925	1,695	8,097	7,212	5,763	232,492	6,759	24	1,226	829	7,863	38,357
1926	1,956	8,961	7,272	5,946	224,673	6,274	43	2,768	808	7,760	41,498
	[7] 63,533	[7] 797,327	520,999	349,881	2,514,825	82,703	157	16,281	113,883	372,796	425,666
Percentage of total production	0.7	8.4	5.5	3.7	26.6	0.9		0.2	1.2	4.0	4.5

[1] 1889–1899, Missouri; 1900–1906, Michigan and Missouri; 1907–1911, Michigan, Missouri, and Utah; 1912, 1917, 1918, Alaska and Michigan; 1913 and 1919, Alaska, Michigan, Missouri, and New Mexico; 1914–1916, Alaska, Michigan, and Missouri; 1920, Alaska, Arkansas, Missouri, New Mexico, and Utah; 1921–1923, Alaska, Missouri, and New Mexico; 1924–1926, Alaska and Utah.

[2] New York included with Pennsylvania.

[3] Tennessee included with Kentucky.

States, 1859–1926, by States

of 42 U. S. gallons]

Texas	Oklahoma	Wyoming	Michigan	Louisiana	New Mexico	Montana	Arkansas	Other [1]	Total		
									Quantity	Value at wells	
										Total (thousands of dollars)	Average per barrel
									74,072	215,781	$2.91
									9,133	22,983	2.52
									13,350	31,789	2.38
									15,397	18,045	1.17
									19,914	17,211	.86
									26,286	24,601	.94
									27,661	25,448	.92
									30,350	23,631	.78
									23,450	25,790	1.10
									24,218	20,596	.85
									21,859	19,198	.88
									28,065	19,996	.71
									28,283	18,877	.67
									27,612	17,948	.65
[4]								[1 4]	35,164	26,963	.77
[4]								[1 4]	45,824	35,365	.77
[4]	[4]							[1 4]	54,293	30,527	.56
[4]	[4]							[1 4]	50,515	25,907	.51
[4]	[4]							[1 4]	48,431	28,950	.60
[4]	[4]	2						[1 4]	49,344	35,522	.72
[4]	[4]	4						[1 4]	52,892	57,632	1.09
1	[4]	3						[1 4]	60,960	58,519	.96
66	1	4						[1 4]	60,476	40,874	.68
546		6						[1 4]	55,364	44,193	.80
669		6						[1 4]	57,071	64,604	1.13
836	6	6	[5]					2	63,621	75,989	1.19
4,394	10	5	[5]					2	69,389	66,417	.96
18,084	37	6	[5]	549				1	88,767	71,179	.80
17,956	139	9	[5]	918				3	100,461	94,694	.94
22,241	1,367	12	[5]	2,959				3	117,081	101,175	.86
28,136	[6]	8	[5]	8,910				3	134,717	84,157	.62
12,568	[6]	7	[5]	9,077				3	126,494	92,445	.73
12,323	43,524	9	[5]	5,000				4	166,095	120,107	.72
11,207	45,799	18	[5]	5,789				15	178,527	129,079	.72
9,534	47,859	20	[5]	3,060				6	183,171	128,329	.70
8,899	52,029	115	[5]	6,841				4	209,557	127,900	.61
9,526	56,069	187	[5]	10,721				8	220,449	134,045	.61
11,735	51,427	1,572	[5]	9,263				4	222,935	164,213	.74
15,010	63,579	2,407	[5]	12,499	[5]			11	248,446	237,121	.95
20,068	73,632	3,560	[5]	14,309				8	265,763	214,125	.81
24,943	97,915	4,246	[5]	18,192				14	281,104	179,463	.64
27,645	107,072	6,234	[5]	15,248		45		8	300,767	330,900	1.10
32,413	107,508	8,978	[5]	11,392		100		10	335,316	522,635	1.56
38,750	103,347	12,596	[5]	16,043		69		8	355,928	703,944	1.98
79,366	86,911	13,172	[5]	17,188	[5]	90		12	378,367	760,266	2.01
96,868	106,206	16,831		35,714	[5]	340	[5]	13	442,929	1,360,745	3.07
106,166	114,634	19,333		27,103	[5]	1,509	10,473	12	472,183	814,745	1.73
118,684	149,571	26,715		35,376	[5]	2,449	12,712	13	557,531	895,111	1.61
131,023	160,929	44,785		24,919	[5]	2,782	36,610	18	732,407	978,430	1.34
134,522	173,538	39,498		21,124	98	2,815	46,028	13	713,940	1,022,683	1.43
144,648	176,768	29,173	4	20,272	1,060	4,091	77,398	12	763,743	1,284,960	1.68
166,916	179,195	25,776	94	23,201	1,666	7,727	58,332	8	770,874	1,447,760	1.88
1,305,743	1,999,072	255,303	[8] 98	355,667	[9] 2,824	22,017	241,553	218	9,440,546	13,093,567	
13.8	21.2	2.7		3.8		0.2	2.6		100.0		

[4] Less than 500 barrels. (See Mineral Resources, 1916, pt. 2, pp. 684–685.)
[5] Included under "Other."
[6] Oklahoma included with Kansas.
[7] Early production in New York included with Pennsylvania.
[8] Figures represent 1925 and 1926 production only. Earlier years included under "Other."
[9] Figures represent 1924–1926 production only. Earlier years included under "Other."

Petroleum produced in the United States, 1925–26, by States

[Thousands of barrels of 42 U. S. gallons]

State	January	February	March	April	May	June	July	August	September	October	November	December	The year	Value at wells (thousands of dollars)
1925														
Arkansas	3,223	2,917	3,781	5,710	10,187	9,348	8,163	7,974	7,028	6,608	6,165	6,294	77,398	68,880
California [1]	19,004	17,104	18,893	18,222	19,116	19,451	20,519	21,123	20,278	20,157	19,192	19,433	232,492	330,610
Colorado	63	57	85	68	75	59	96	103	143	149	169	159	1,226	1,810
Illinois	662	604	728	586	661	665	690	647	667	677	639	637	7,863	15,235
Indiana:														
Southwestern	56	53	50	58	54	58	59	51	54	54	49	53	649	1,245
Northeastern	15	15	18	18	16	17	17	16	14	12	11	11	180	370
Total Indiana	71	68	68	76	70	75	76	67	68	66	60	64	829	1,615
Kansas	2,455	2,534	2,835	2,942	3,448	3,563	3,613	3,604	3,424	3,458	3,267	3,214	38,357	74,410
Kentucky	575.7	544.4	592.4	579.5	580.6	567.2	598.6	556	561.6	552.8	534.2	516	6,759	15,682
Louisiana:														
Gulf coast [2]	224	196	227	215	260	214	260	268	296	355	364	348	3,227	5,080
Northern	1,492	1,340	1,488	1,490	1,507	1,449	1,458	1,456	1,379	1,367	1,291	1,328	17,045	27,420
Total Louisiana	1,716	1,536	1,715	1,705	1,767	1,663	1,718	1,724	1,675	1,722	1,655	1,676	20,272	32,500
Montana	243	232	239	247	295	327	366	406	393	469	488	386	4,091	6,420
New Mexico	20	16	35	57	57	76	105	127	133	151	145	138	1,060	1,815
New York	125	122	139	134	138	146	150	148	147	152	144	150	1,695	6,270
Ohio:														
Central and eastern	409	393	438	447	428	453	458	447	450	460	423	466	5,272	14,070
Northwestern	151	150	165	172	166	181	176	166	165	161	141	146	1,940	4,210
Total Ohio	560	543	603	619	594	634	634	613	615	621	564	612	7,212	18,280
Oklahoma	15,002	13,989	14,776	14,818	14,775	14,684	14,777	14,797	15,228	15,020	14,789	14,113	176,768	348,230
Pennsylvania	613	593	684	697	669	700	708	704	701	710	651	667	8,097	29,310
Tennessee	.3	.6	.6	1.5	1.4	1.8	1.4	2	1.4	2.2	4.8	6	24	53
Texas:														
Gulf coast [2]	1,921	1,784	2,568	2,657	2,995	2,716	2,852	2,627	2,582	2,548	2,313	2,322	29,885	48,280
Rest of State	11,361	9,487	10,551	9,920	10,491	9,714	9,705	9,327	8,759	8,784	8,349	8,315	114,763	213,990
Total Texas	13,282	11,271	13,119	12,577	13,486	12,430	12,557	11,954	11,341	11,332	10,662	10,637	144,648	262,270
West Virginia	475	446	488	491	477	511	501	476	485	503	436	474	5,763	20,055
Wyoming	2,309	2,197	2,557	2,517	2,452	2,338	2,489	2,554	2,541	2,490	2,360	2,369	29,173	51,467
Other [3]	1	1	1	1	1	1	1	1	2	2	2	2	16	48
United States	60,400	54,775	61,339	62,048	68,850	67,240	67,763	67,580	65,432	64,842	61,927	61,547	763,743	1,284,960

1926														
Arkansas	5,409	4,852	5,137	5,310	5,335	4,977	4,997	4,861	4,611	4,516	4,194	4,133	58,332	64,600
California [1]	19,047	17,175	18,826	18,056	18,716	18,276	18,790	18,905	18,218	19,020	19,249	20,395	224,673	345,547
Colorado	181	195	200	189	219	256	299	274	244	234	234	243	2,768	5,100
Illinois	635	600	729	579	650	662	680	670	657	651	616	631	7,760	17,200
Indiana:														
Southwestern	54	55	50	54	57	56	56	54	54	53	56	59	658	1,460
Northeastern	10	13	14	13	13	14	14	14	13	12	9	11	150	310
Total Indiana	64	68	64	67	70	70	70	68	67	65	65	70	808	1,770
Kansas	3,199	2,932	3,248	3,395	3,522	3,624	3,740	3,685	3,498	3,610	3,461	3,584	41,498	93,800
Kentucky	499	485	531	517	522	526	549	540	532	536	521	516	6,274	15,250
Louisiana:														
Gulf coast [2]	332	310	370	356	320	328	414	409	364	296	316	325	4,140	5,750
Northern	1,361	1,240	1,522	1,577	1,799	1,774	1,705	1,641	1,640	1,631	1,555	1,616	19,061	32,450
Total Louisiana	1,693	1,550	1,892	1,933	2,119	2,102	2,119	2,050	2,004	1,927	1,871	1,941	23,201	38,200
Michigan	2	1	2	3	3	3	4	7	8	15	20	26	94	253
Montana	379	479	776	735	779	795	914	792	648	588	475	367	7,727	10,170
New Mexico	133	112	128	116	159	128	134	131	157	140	160	168	1,666	3,270
New York	147	141	158	165	156	162	174	167	171	176	158	181	1,956	7,200
Ohio:														
Central and eastern	410	406	471	447	438	472	463	464	452	449	449	471	5,392	14,780
Northwestern	147	145	165	158	163	181	169	160	156	154	137	145	1,880	4,400
Total Ohio	557	551	636	605	601	653	632	624	608	603	586	616	7,272	19,180
Oklahoma	13,787	12,706	14,345	14,466	14,924	14,424	14,793	14,844	14,335	15,891	16,829	17,851	179,195	413,900
Pennsylvania	654	650	726	748	748	777	784	783	772	802	760	757	8,961	31,930
Tennessee	3	4	3	5	4	4	3	2	5	3	4	3	43	100
Texas:														
Gulf coast [2]	2,500	2,384	2,388	2,401	2,496	2,304	3,231	4,463	4,547	4,600	4,772	5,049	41,135	61,850
Rest of State	8,155	7,319	8,201	8,342	9,063	9,445	10,609	11,573	12,123	13,703	13,497	13,751	125,781	246,850
Total Texas	10,655	9,703	10,589	10,743	11,559	11,749	13,840	16,036	16,670	18,303	18,269	18,800	166,916	308,700
West Virginia	449	440	497	493	490	510	518	504	518	519	489	519	5,946	20,560
Wyoming	2,488	2,248	2,392	2,245	2,245	2,090	2,127	2,065	2,058	2,064	1,930	1,824	25,776	51,020
Other [4]			1	1	1	1	1	1	1	1			8	10
United States	59,981	54,892	60,880	60,371	62,822	61,789	65,168	67,009	65,782	69,664	69,891	72,625	770,874	1,447,760

[1] Annual and semiannual figures from California State Mining Bureau. Monthly figures prorated on basis of monthly reports by the American Petroleum Institute.
[2] Salt-dome pools.
[3] Alaska, 8,000 barrels, valued at $34,000; Michigan, 4,000 barrels, $10,000; and Utah, 4,000 barrels, $4,000.
[4] Alaska, 7,600 barrels, valued at $9,600, and Utah, 525 barrels, $656.

Arkansas.—In 1926 Arkansas produced 58,332,000 barrels of crude petroleum, a decrease from the previous year of 19,066,000 barrels, or 25 per cent. This decrease in yearly output was the first on record since oil was discovered in Arkansas.

In spite of the fact that over 300 wells were drilled in the Smackover field in 1926 and a considerable number were deepened to the once prolific Graves sand, the production of this remarkable field declined from 72,144,000 barrels in 1925 to 52,063,000 in 1926. The average daily initial production decreased from approximately 1,000 barrels in 1925 to 100 barrels in 1926.

Two new fields, Bradley and Lisbon, were developed in Arkansas in 1926. Bradley, in Lafayette County, was small and unimportant. Lisbon, discovered early in the year in Union County, produced 2,125,000 barrels of petroleum obtained from a large number of small wells in the Nacatoch sand. The output of this field was roughly equal to the decline of the El Dorado and Stephens fields.

The decline in production at Smackover served to tighten the market, so that prices in this area were higher and much more stable than in 1925. This improvement in market conditions served, as always, to stimulate wildcatting, which, however, showed little results.

Petroleum produced in Arkansas, 1921–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Bradley	El Dorado	Irma	Lisbon	Smackover	Stephens	Total
1921		10,473					10,473
1922		10,592			2,107	13	12,712
1923		5,830	(1)		30,048	1 732	36,610
1924		4,760	450		40,000	818	46,028
1925		4,247	334		72,144	673	77,398
1926	52	2,722	763	2,125	52,063	607	58,332

[1] Irma included with Stephens.

Petroleum produced in Arkansas, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
El Dorado	330	297	332	319	316	344	418	421	399	362	353	319	4,210	37	4,247
Irma	26	18	11	11	10	15				32	26	28	177	157	334
Smackover	2,722	2,471	3,303	5,245	9,721	8,856	7,606	7,417	6,497	6,085	5,659	5,816	71,398	746	72,144
Stephens	60	54	50	53	55	51	54	51	50	44	45	46	613	60	673
	3,138	2,840	3,696	5,628	10,102	9,266	8,078	7,889	6,946	6,523	6,083	6,209	76,398	1,000	77,398
1926															
Bradley		1	2	5	4	5	4	4	7	7	7	6	52		52
El Dorado	281	257	202	222	262	276	237	227	200	215	200	198	2,777	−55	2,722
Irma	43	43	47	48	68	134	78	106	98	78	67	61	871	−108	763
Lisbon		8	84	205	286	234	267	248	229	186	158	166	2,071	54	2,125
Smackover	5,149	4,600	4,867	4,886	4,777	4,384	4,460	4,338	4,132	4,078	3,813	3,765	53,249	−1,186	52,063
Stephens	44	41	43	48	46	48	59	46	49	60	53	45	582	25	607
	5,517	4,950	5,245	5,414	5,443	5,081	5,105	4,969	4,715	4,624	4,298	4,241	59,602	−1,270	58,332

California.—California again ranked first among the producing States in 1926, with a total output of 224,673,000 barrels, a decrease from 1925 of nearly 8,000,000 barrels.

The outstanding event in the State in 1926 was the discovery of the Seal Beach field by the Marland Oil Co. The existence of this field had been suspected for some time, but a number of wildcats in the vicinity had been unsuccessful.

From the standpoint of production the increased output of the Ventura Avenue field was of first importance.

Although recording a decline in output, Long Beach was again the leading producing field of the State. Interest in Huntington Beach was revived when drilling uncovered what was called a west extension but which appears to be a separate structure. The town-lot development which followed resulted in an increase in the total for the year over 1925 and caused this field to surpass Santa Fe Springs. The latter field was quiet throughout the year and suffered a normal decline. The majority of the San Joaquin Valley fields recorded decreases in output in 1926, probably due to considerable shut-in production which, in turn, resulted from the excess stocks of fuel oil. Shut-in production was not confined to the valley fields but extended to fields like Inglewood and Coyote, where deeper sands were proved but not developed.

Drilling as measured by the number of completions again showed a decline. Wildcatting continued to be fairly active, particularly in the area between Inglewood and Rosecrans, where some promising showings were uncovered.

Petroleum produced in California, 1922–1926, by counties [1]

[Thousands of barrels of 42 U. S. gallons]

County	1922	1923	1924	1925	1926
Fresno	9,266	5,061	10,156	7,774	7,340
Kern	53,512	45,953	61,175	58,853	54,550
Los Angeles	37,726	158,665	119,028	121,214	105,826
Orange	31,049	46,475	31,661	32,734	37,989
San Luis Obispo	[2] 34	33	31	30	28
Santa Barbara	3,931	3,062	2,905	2,647	1,925
Santa Clara	16	[2] 16	[3] 19	[3] 18	[4] 21
Ventura	2,934	3,611	3,958	9,222	16,994
	138,468	262,876	228,933	232,492	224,673

[1] California State Mining Bureau.
[2] Includes San Mateo.
[3] Includes San Mateo and San Bernardino.
[4] Includes Kings, San Bernardino, San Mateo, and Sonoma.

Petroleum produced in California, 1925–26, by fields

[Barrels of "clean oil," from State Mining Bureau]

Field	1925			1926		
	Jan. 1 to June 30	July 1 to Dec. 31	Total	Jan. 1 to June 30	July 1 to Dec. 31	Total
District No. 1:						
Beverly Hills	77,551	77,805	155,356	70,279	76,270	146,549
Brea Olinda	2,222,172	2,398,051	4,620,223	3,045,448	4,016,252	7,061,700
Coyote Hills	3,778,599	3,511,808	7,290,407	3,069,573	2,956,893	6,026,466
Dominguez	8,304,626	5,213,775	13,518,401	3,911,290	3,927,927	7,839,217
Huntington Beach	7,781,437	8,522,295	16,303,732	8,168,887	11,079,825	19,248,712
Inglewood	2,620,186	15,751,350	18,371,536	9,722,917	7,921,104	17,644,021
Long Beach	21,168,239	19,395,621	40,563,860	19,624,052	17,955,897	37,579,949
Montebello	3,445,126	3,456,759	6,901,885	3,293,288	3,306,294	6,599,582
Newhall	40,998	44,931	85,929	34,346	35,372	69,718
Newport	19,796	17,523	37,319	17,080	15,617	32,697
Richfield	2,072,658	2,413,321	4,485,979	2,382,556	3,240,458	5,623,014
Rosecrans	3,337,838	4,388,545	7,726,383	3,507,322	2,560,649	6,067,971
Salt Lake	197,364	191,253	388,617	175,756	177,111	352,867
Santa Fe Springs	9,465,787	9,879,075	19,344,862	9,059,025	8,669,116	17,728,141
Seal Beach					587,448	587,448
Torrance	7,123,179	6,112,088	13,235,267	5,310,498	4,982,824	10,293,322
Whittier	382,812	381,843	764,655	385,826	373,926	759,752
	72,038,368	81,756,043	153,794,411	71,778,143	71,882,983	143,661,126
Los Angeles City field	(1)	(1)	[2] 157,909	(1)	(1)	149,857
District No. 2:						
Bardsdale	177,466	186,769	364,235	170,015	168,114	338,129
Conejo	106	7,476	7,582	[3] 1,391	200	1,591
Ojai	37,149	36,305	73,454	35,061	33,213	68,274
Piru	61,546	64,611	126,157	81,956	90,982	172,938
Santa Paula	13,351	11,223	24,574	10,147	10,429	20,576
Sespe	25,802	22,875	48,677	24,352	22,997	47,349
Simi	29,796	28,375	58,171	26,070	24,762	50,832
South Mountain	760,556	729,695	1,490,251	700,487	722,374	1,422,861
Ventura	2,590,585	4,438,160	7,028,745	5,684,223	9,187,502	14,871,725
	3,696,357	5,525,489	9,221,846	6,733,702	10,260,573	16,994,275
District No. 3:						
Arroyo Grande	15,756	13,834	29,590	12,975	15,007	27,982
Casmalia	471,056	286,143	757,199	32,356	20,367	52,723
Cat Canyon	301,965	362,446	664,411	379,021	390,380	769,401
Half Moon Bay [3]	388	388	776	388	388	776
Lompoc	18,995	18,460	37,455	16,457		16,457
Moody Gulch	330	338	668			
Santa Maria	562,750	573,365	1,136,115	543,931	519,964	1,063,895
Sargent	6,660	6,500	13,160	6,315	6,270	12,585
Summerland [3]	26,100	26,100	52,200	16,458	16,786	33,244
	1,404,000	1,287,574	2,691,574	1,007,901	969,162	1,977,063
District No. 4:						
Belridge-Lost Hills-Devils Den	887,262	827,733	1,714,995	808,090	870,037	1,678,127
Elk Hills	6,782,071	5,229,126	12,011,197	5,850,940	6,291,218	12,142,158
Kern River	3,100,983	2,627,218	5,728,201	2,056,614	2,169,833	4,226,447
McKittrick-Temblor	1,066,365	1,078,301	2,144,666	1,013,965	993,144	2,007,109
Midway-Sunset	18,633,659	18,269,215	36,902,874	16,908,188	17,161,821	34,070,009
Mount Poso					52,124	52,124
Wheeler Ridge	174,740	176,069	350,809	178,405	195,247	373,652
	30,645,080	28,207,662	58,852,742	26,816,202	27,733,424	54,549,626
District No. 5:						
Coalinga	3,927,423	3,846,242	7,773,665	3,685,394	3,654,708	7,340,102
Petaluma					1,232	1,232
	3,927,423	3,846,242	7,773,665	3,685,394	3,655,940	7,341,334
Grand total	(1)	(1)	232,492,147	(1)	(1)	224,673,281

[1] Semiannual figures for Los Angeles City field not available.
[2] Includes San Mateo County.
[3] Estimated.

Petroleum produced in California, 1925–26, by districts and months [1]

[Thousands of barrels of 42 U. S. gallons]

District	January	February	March	April	May	June	July	August	September	October	November	December	The year
1925													
Coalinga	695	631	686	649	663	627	720	701	624	606	571	578	7,751
Coyote	627	552	627	611	654	625	625	622	583	563	523	528	7,140
Dominguez	1,766	1,430	1,509	1,356	1,146	961	939	916	864	858	810	774	13,329
Elk Hills	1,148	1,057	1,175	1,129	1,193	1,071	883	860	810	838	903	904	11,971
Fullerton	372	328	357	340	358	340	348	389	404	413	399	433	4,481
Huntington Beach	1,292	1,145	1,324	1,266	1,302	1,316	1,333	1,368	1,350	1,391	1,364	1,437	15,888
Inglewood	7	13	51	108	583	1,878	3,072	3,231	2,842	2,494	2,119	1,950	18,348
Kern River	551	500	539	536	546	529	549	546	481	385	373	367	5,902
Long Beach	3,791	3,318	3,631	3,371	3,377	3,217	3,202	3,294	3,130	3,234	3,229	3,379	40,173
Los Angeles-Salt Lake	65	61	60	62	61	60	59	63	61	61	60	59	732
Lost Hills-Belridge	154	142	155	153	153	145	144	141	134	142	137	130	1,730
McKittrick	177	160	182	175	175	173	178	179	174	174	172	173	2,092
Midway-Sunset	3,283	2,916	3,184	3,060	3,213	3,069	3,077	3,155	3,112	3,107	2,886	2,861	36,923
Montebello	602	540	574	566	581	566	579	558	564	596	556	561	6,843
Richfield	350	304	329	326	344	360	360	364	353	395	420	414	4,319
Rosecrans	263	333	529	544	615	670	611	717	746	788	685	762	7,263
Santa Fe Springs	1,536	1,404	1,550	1,568	1,636	1,592	1,651	1,660	1,615	1,658	1,551	1,549	18,970
Santa Maria	234	207	228	240	225	217	233	235	232	203	169	174	2,597
Summerland	5	4	4	4	4	3	4	4	4	4	4	4	48
Torrance	1,295	1,160	1,203	1,153	1,141	1,108	1,081	1,110	1,043	1,004	967	977	13,242
Ventura-Newhall	427	575	634	647	758	672	664	794	846	1,002	1,105	1,139	9,263
Wheeler Ridge	33	30	30	27	27	25	27	30	26	32	27	31	345
Whittier	68	58	63	60	59	59	66	62	61	63	62	62	743
Other	2	2	2	9	6	5	6	6	4	4	4	4	54
	18,743	16,870	18,626	17,960	18,820	19,288	20,411	21,005	20,063	20,015	19,096	19,250	230,147
1926													
Coalinga	588	575	651	630	629	615	617	603	582	612	593	601	7,296
Coyote	532	464	523	513	523	502	515	510	495	503	465	486	6,031
Dominguez	730	627	645	630	653	616	650	681	671	682	608	609	7,802
Elk Hills	937	904	1,032	980	1,042	1,054	1,053	1,079	1,041	1,061	1,037	1,073	12,293
Fullerton	436	423	562	539	542	514	528	582	602	683	746	830	6,987
Huntington Beach	1,426	1,266	1,424	1,327	1,363	1,302	1,356	1,376	1,356	1,681	2,260	2,928	19,065
Inglewood	1,768	1,542	1,645	1,554	1,589	1,484	1,442	1,387	1,276	1,279	1,198	1,226	17,390
Kern River	370	344	374	358	369	352	350	357	348	384	370	382	4,358
Long Beach	3,460	3,186	3,433	3,287	3,307	3,193	3,290	3,111	2,913	2,963	2,865	2,924	37,932
Los Angeles-Salt Lake	57	54	59	55	55	54	57	57	57	59	55	57	676
Lost Hills-Belridge	136	119	138	139	143	141	143	143	144	151	145	152	1,694
McKittrick	174	151	169	165	167	161	165	162	161	165	155	166	1,961

[1] Monthly figures of American Petroleum Institute and do not agree with final figures of California State Mining Bureau.

Petroleum produced in California, 1925–26, by districts and months—Continued

[Thousands of barrels of 42 U. S. gallons]

District	January	February	March	April	May	June	July	August	September	October	November	December	The year
1926—Continued													
Midway-Sunset	2,875	2,584	2,884	2,827	2,924	2,817	2,913	2,894	2,826	2,894	2,734	2,797	33,969
Montebello	549	498	548	540	555	553	573	560	534	540	525	540	6,515
Richfield	397	368	406	389	402	422	446	543	541	540	538	582	5,574
Rosecrans	730	601	629	542	514	506	484	422	408	443	444	391	6,114
Santa Fe Springs	1,530	1,397	1,535	1,472	1,497	1,455	1,516	1,500	1,418	1,425	1,355	1,347	17,447
Santa Maria	161	158	168	149	158	154	148	155	149	155	149	148	1,852
Seal Beach								32	53	54	153	295	587
Summerland	4	3	4	4	4	4	4	4	4	4	4	4	47
Torrance	952	819	906	887	928	873	874	870	810	824	797	815	10,355
Ventura Avenue	975	823	814	829	1,019	1,208	1,334	1,451	1,439	1,565	1,700	1,639	14,796
Ventura-Newhall	183	168	173	177	185	191	186	188	182	196	185	190	2,204
Wheeler Ridge	29	27	30	30	29	32	33	33	31	33	33	32	372
Whittier	66	59	68	64	66	62	63	62	59	63	55	59	746
Other	5	4	6	5	4	4	3	3	5	7	4	4	54
	19,070	17,164	18,826	18,092	18,667	18,269	18,743	18,765	18,105	18,966	19,173	20,277	224,117

Colorado.—The State produced 2,768,000 barrels of crude petroleum in 1926, as compared with 1,226,000 barrels in 1925. Fort Collins and Moffat, the largest fields in the State, were defined in 1926. The old Florence field, renewing activity, produced 148,000 barrels, the highest output since 1916. Wildcatting was carried on but with little success.

Petroleum produced in Colorado, 1917–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Boulder	Florence	Fort Collins	Iles Dome	Moffat	Rangely	Other	Total
1917	6	114					1	121
1918	4	135					4	143
1919	5	102				14		121
1920	7	88				16		111
1921	5	83				20		108
1922	4	70				23		97
1923	4	62				20		86
1924	4	70	86		256	29		445
1925	3	97	430	17	605	32	[1] 42	1, 226
1926	2	148	1, 222	24	1, 199	33	[1] 140	2, 768

[1] Tow Creek.

Petroleum produced in Colorado, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties												Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year	
1925														
Boulder	2	3	1	4	4	3	3	3	3	3	3	3	3	3
Rangely													32	32
Florence	6	6	7	7	8	8	8	10	8	9	12	11	100	−3	97
Fort Collins	20	17	44	28	31	20	47	45	42	32	52	47	425	5	430
Iles Dome							3	3	2	2	2	5	17		17
Moffat	30	24	22	21	23	20	31	37	84	98	96	88	574	31	605
Tow Creek		3	6	4	4	4							21	21	42
	58	53	80	64	70	55	92	98	139	144	165	154	1, 172	54	1, 226
1926														
Boulder	3	2	2	3	2	2	3	4	4	4	3	3	35		35
Rangely															
Florence	11	11	11	10	12	14	13	12	14	15	13	12	148		148
Fort Collins	68	71	79	81	80	120	149	126	108	108	108	120	1, 218	4	1, 222
Iles Dome	4	2	3	2	2	2	2	2	1	1	1	1	23	1	24
Moffat	89	103	99	86	117	110	108	100	92	84	90	89	1, 167	32	1, 199
Tow Creek	3	3	3	4	3	5	21	27	22	19	16	14	140		140
	178	192	197	186	216	253	296	271	241	231	231	239	2, 731	37	2, 768

Kansas.—Despite the fact that no flush fields of large size were discovered in Kansas in 1926, production showed a slight increase. The total output for the year was 41,498,000 barrels, a gain of approximately 3,000,000 barrels over 1925. Wildcatting was carried on quite extensively with the result that many important extensions to the old fields were discovered, as well as a number of new ones of importance. The most active area in the State in 1926 was the Greenwood-Woodson district, in which the Seely and Teeter-Pixley pools made material gains in output over 1925.

Petroleum produced in Kansas, 1925–26, by districts and months[1]

[Thousands of barrels of 42 U. S. gallons]

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	The year
1925													
Anderson	51	45	51	49	50	48	78	80	83	90	101	98	824
Butler:													
East Butler	33	30	33	30	32	30	30	33	29	29	37	45	391
Eldorado	190	169	207	196	204	195	210	212	200	211	200	203	2,397
Other	556	510	602	573	611	576	623	594	570	564	539	553	6,871
Cowley:													
Rainbow	249	336	343	290	527	449	400	329	277	323	203	223	3,949
Winfield-New Salem	34	51	63	73	78	75	79	63	53	60	54	61	744
Other	154	151	175	183	250	209	227	209	201	206	201	180	2,346
Greenwood-Woodson:													
Seely	133	121	151	206	257	245	295	316	305	289	275	285	2,878
Teeter-Pixley	98	116	168	261	317	300	510	558	554	580	544	569	4,575
Virgil	150	133	148	149	151	147	156	165	148	149	142	143	1,781
Other	326	304	335	384	391	376	396	380	355	342	320	322	4,231
Russell	33	37	47	54	84	70	182	149	161	175	170	174	1,336
Other	514	464	502	523	541	509	501	470	457	459	436	453	5,829
	2,521	2,467	2,825	2,971	3,493	3,229	3,687	3,558	3,393	3,477	3,222	3,309	38,152
1926													
Anderson	99	91	99	99	104	101	100	96	90	99	90	93	1,161
Butler:													
East Butler	70	64	112	155	164	159	134	39	39	37	36	36	1,045
Eldorado	200	171	199	192	202	195	202	203	190	212	217	223	2,406
Other	541	463	566	515	533	508	550	664	644	673	623	646	6,926
Cowley:													
Rainbow	199	127	140	134	130	114	123	106	80	92	91	69	1,405
Winfield-New Salem	64	60	64	58	58	59	75	72	62	82	79	82	815
Other	162	137	146	150	150	139	158	150	137	143	131	120	1,723
Greenwood-Woodson:													
Seely	278	284	347	395	453	434	483	499	463	464	423	433	4,956
Teeter-Pixley	576	542	617	600	633	605	613	593	538	515	463	481	6,776
Virgil	140	129	140	139	142	132	142	138	136	149	141	144	1,672
Other	307	275	296	277	288	270	308	330	330	319	328	343	3,671
Russell	158	158	179	167	179	164	159	148	139	142	135	130	1,858
Sumner	2	1	2	10	10	10	11	107	104	285	346	360	1,248
Other	455	390	428	439	471	456	524	536	498	503	491	494	5,685
	3,251	2,892	3,335	3,330	3,517	3,346	3,582	3,681	3,450	3,715	3,594	3,654	41,347

[1] Monthly estimates of Oil and Gas Journal.

Louisiana.—For the first time since 1922 Louisiana not only checked its falling output but recorded an increase in annual production. The output in this State in 1926 amounted to 23,201,000 barrels, of which 19,061,000 barrels, or 82 per cent, was produced in the inland fields of the State, and 4,140,000 barrels, or 18 per cent, in the coastal or salt-dome fields.

The most important feature of the year was the development of the Urania field in La Salle Parish. This field produced 3,669,000 barrels in 1926, as compared with 10,000 in 1925, and was the chief cause of the increased production for the State. The old Caddo field recorded a material gain in production, due to fair success in deeper drilling. Haynesville continued to decline rapidly, falling from first to third place in the rank of producing fields. Of the coastal fields Lockport showed the largest increase in production and was mainly responsible for the increase in production of the area.

Wildcatting in inland Louisiana centered around attempts to locate fields similar to Urania on the so-called Angelina-Caldwell flexure. Little success attended these efforts, although some favorable looking areas were proven by gassers in the northern part of the State. Considerable geophysical work was done in the Gulf coast area, with the result that several salt domes were discovered—Sweet Lake, in Cameron Parish, was the most promising.

Petroleum produced in Louisiana, 1917–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Gulf coast (salt-dome pools)							Northern										Total for State
	Anse la Butte	Edgerley	Jennings	Lockport	Vinton	Other	Total	Bellevue	Caddo	Cotton Valley	De Soto	Elm Grove	Haynesville	Homer	Red River (Bull Bayou, Crichton)	Urania	Other	Total	
1917	5	806	399	----	1,595	25	2,830	----	5,483	----	1,371	----	------	------	1,665	----	43	8,562	11,392
1918	[1]3	512	369	----	1,839	15	2,738	----	11,144	----	1,066	----	------	------	1,046	----	49	13,305	16,043
1919	--	361	347	----	1,592	9	2,309	----	[1]8,700	----	[1]1,200	----	------	[1]2,000	[1]2,900	----	79	14,879	17,188
1920	--	379	232	----	1,333	3	1,947	----	6,336	----	(2)	----	------	21,508	[2]5,923	----	--	33,767	35,714
1921	47	250	254	----	1,379	---	1,930	----	5,342	----	719	---	3,161	13,030	2,844	----	77	25,173	27,103
1922	36	125	191	----	1,395	---	1,747	1,050	4,498	----	531	160	19,939	5,673	1,778	----	--	33,629	35,376
1923	18	157	204	----	2,071	---	2,450	2,351	4,178	----	429	220	10,496	3,581	1,207	----	7	22,469	24,919
1924	12	166	213	128	1,968	---	2,487	1,749	4,319	1,211	353	217	6,720	2,837	1,231	----	--	18,637	21,124
1925	17	185	278	471	2,274	[3]2	3,227	1,129	4,067	3,348	305	212	4,604	2,296	1,074	10	--	17,045	20,272
1926	17	207	312	1,343	2,215	[4]16	4,140	788	4,749	2,914	321	222	3,328	2,033	1,037	3,669	--	19,061	23,201

[1] Estimated.
[2] De Soto included with Red River.
[3] Welsh.
[4] Sweet Lake and Welsh.

Petroleum produced in Louisiana, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties												Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year	
1925														
Gulf coast (salt-dome pools):														
Anse la Butte [1]	1	1	1	2	2	2	2	2	1	1	1	1	17	2	19
Edgerley	12	14	14	17	17	12	18	16	16	15	12	12	175	10	185
Jennings	18	18	26	20	22	21	20	20	20	22	26	34	267	11	278
Lockport	10								58	122	129	100	419	52	471
Vinton	174	155	176	167	209	169	210	220	191	185	187	191	2,234	40	2,274
	215	188	217	206	250	204	250	258	286	345	355	338	3,112	115	3,227
Northern:															
Bellevue	125	117	131	132	88	86	87	88	80	72	60	65	1,131	−2	1,129
Caddo	337	317	354	342	356	340	338	349	331	338	329	343	4,074	−7	4,067
Cotton Valley	214	191	232	278	319	316	328	321	306	288	255	297	3,345	3	3,348
De Soto	29	26	27	27	26	26	26	25	23	24	25	25	309	−4	305
Elm Grove	15	14	16	15	17	22	20	21	19	18	18	19	214	−2	212
Haynesville	467	399	425	408	410	385	375	375	353	356	342	317	4,612	−8	4,604
Homer	211	191	210	198	201	188	195	188	181	184	177	178	2,302	−6	2,296
Red River (Bull Bayou, Crichton)	96	87	95	92	92	88	91	91	87	87	85	84	1,075	−1	1,074
Urania									1	2	2	2	7	3	10
	1,494	1,342	1,490	1,492	1,509	1,451	1,460	1,458	1,381	1,369	1,293	1,330	17,069	−24	17,045
	1,709	1,530	1,707	1,698	1,759	1,655	1,710	1,716	1,667	1,714	1,648	1,668	20,181	91	20,272
1926															
Gulf coast (salt-dome pools):															
Anse la Butte [2]	1		1	1		2	3	2	1	1	2	8	22	11	33
Edgerley	11	13	24	14	17	18	21	20	18	14	14	16	200	7	207
Jennings	24	22	27	27	31	26	33	30	27	25	24	29	325	17	342
Lockport	64	76	100	115	72	79	130	155	134	64	93	87	1,169	174	1,343
Vinton	211	179	196	178	178	182	205	180	163	170	162	163	2,167	48	2,215
	311	290	348	335	298	307	392	387	343	274	295	303	3,883	257	4,140
Northern:															
Bellevue	80	53	67	73	77	103	53	69	61	54	53	47	790	−2	788
Caddo	350	328	370	341	400	400	405	410	399	436	434	461	4,734	15	4,749
Cotton Valley	286	232	260	286	286	260	271	189	227	215	200	204	2,916	−2	2,914
De Soto	28	25	26	26	26	24	27	27	29	27	27	29	321		321
Elm Grove	18	17	24	20	18	18	19	18	18	18	17	17	222		222
Haynesville	319	280	312	292	309	284	279	287	260	259	220	243	3,344	−16	3,328
Homer	182	161	177	171	174	167	173	173	168	167	158	165	2,036	−3	2,033
Red River (Bull Bayou, Crichton)	83	76	90	88	87	85	90	91	88	86	85	88	1,037		1,037
Urania	2	56	183	267	409	420	374	363	377	355	348	348	3,502	167	3,669
	1,348	1,228	1,509	1,564	1,786	1,761	1,691	1,627	1,627	1,617	1,542	1,602	18,902	159	19,061
	1,659	1,518	1,857	1,899	2,084	2,068	2,083	2,014	1,970	1,891	1,837	1,905	22,785	416	23,201

[1] Includes Welsh.

[2] Includes Sweet Lake and Welsh.

Montana.—The production of crude petroleum in Montana in 1926 amounted to 7,727,000 barrels, a new high figure, representing an increase of 89 per cent over 1925. This phenomenal increase resulted from developments in the Kevin-Sunburst field, which is by far the most important field in the State.

The only development of note in Montana during the year 1926 was the extension of the Kevin-Sunburst field to the southeast in the early spring. The comparatively shallow depth of the wells (1,500 to 2,000 feet) contributed to a rapid drilling campaign and caused an overtaxing of transportation and storage facilities. The peak of nearly 30,000 barrels a day, reached in midsummer, was followed by a rather rapid decline, so that by the end of the year production was hardly more than a third of its maximum and was insufficient to fill the demand. Much wildcat activity in the vicinity followed but by the end of the year had uncovered little of consequence.

Petroleum produced in Montana, 1917–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Cat Creek	Elk Basin	Kevin-Sunburst	Lake Basin	Other	Total
1917		100				100
1918		69				69
1919		90				90
1920	243	97				340
1921	1,408	75			26	1,509
1922	2,333	46	36		34	2,449
1923	2,227	28	523		4	2,782
1924	1,572	24	1,217		2	2,815
1925	1,255	21	2,780	31	4	4,091
1926	1,015	19	6,630	63		7,727

Petroleum produced in Montana, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
Cat Creek	117	101	107	104	109	105	104	106	100	99	94	97	1,243	12	1,255
Elk Basin	1	1	2	2	2	2	2	2	2	1	2	2	21		21
Kevin-Sunburst	119	124	124	135	178	214	245	280	283	362	386	281	2,731	49	2,780
Lake Basin							9	12	2	1			24	7	31
Other														4	4
	237	226	233	241	289	321	360	400	387	463	482	380	4,019	72	4,091
1926															
Cat Creek	91	83	88	87	88	86	85	84	79	80	74	73	998	17	1,015
Elk Basin	2	1	2	2	2	2	2	1	1	2	1	1	19		19
Kevin-Sunburst	283	392	682	643	685	700	805	693	555	494	394	286	6,612	18	6,630
Lake Basin						4	18	10	10	8	3	4	57	6	63
	376	476	772	732	775	792	910	788	645	584	472	364	7,686	41	7,727

New Mexico.—New Mexico in 1926 produced 1,666,000 barrels, as compared with 1,060,000 barrels in 1925. Of the total the Artesia field produced slightly over 1,000,000 barrels. This field was the center of considerable wildcatting, with the result that a new field, Maljamar, was discovered a short distance to the east. Efforts to extend the old field proper were not particularly successful, and by the end of the year it was declining rapidly. The light-oil fields of San Juan County showed increases in output in 1926, as a result principally of the completion of a pipe-line outlet to Gallup.

Petroleum produced in New Mexico, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
Artesia	----	----	14	18	22	42	68	91	102	119	117	110	703	45	748
Hogback	14	10	15	16	18	15	16	16	17	17	16	17	187	----	187
Rattlesnake [1]	----	----	----	17	11	12	14	14	8	9	6	5	96	29	125
	14	10	29	51	51	69	98	121	127	145	139	132	986	74	1,060
1926															
Artesia	111	90	98	96	93	83	80	77	72	73	69	64	1,006	10	1,016
Hogback	16	14	16	13	15	14	20	23	22	24	23	21	221	----	221
Maljamar	----	----	----	----	----	----	----	----	----	----	----	----	----	2	2
Rattlesnake [1]	5	8	13	6	50	30	33	30	62	42	67	82	428	−1	427
	132	112	127	115	158	127	133	130	156	139	159	167	1,655	11	1,666

[1] Includes Bloomfield in 1925 and Bloomfield and Table Mesa in 1926.

Oklahoma.—Oklahoma established a new record for petroleum production in 1926, when its output amounted to 179,195,000 barrels. This represents an increase of nearly 2,500,000 barrels over 1925 and compares with the 3,000,000-barrel increase in 1925 over 1924.

The discovery and late-season development of the Seminole field was the outstanding event of the year in Oklahoma. The field is composed of a number of pools, four of which were discovered in 1926 in the order named—Seminole City, Searight, Earlsboro, and Bowlegs. In March the Indian Territory Illuminating Co. uncovered a 1,000-barrel well in the Hunton lime, but real development did not start until July, when the Independent-Garland interests discovered the Wilcox sand production at a depth of slightly over 4,000 feet. The usual frenzied activity followed, with the result that the pipe-line facilities were overtaxed and tanks could not be built fast enough to care for the excess output. By the end of the year production was well over 150,000 barrels per day, with no peak in sight.

The leading field in the State from point of total production for the entire year was Burbank, which maintained an almost uniform output of 45,000 barrels per day throughout the year. Tonkawa continued to decline and yielded first place in the rank of producing fields to Burbank.

Wildcatting was active over the entire State, and several new fields were indicated. The Wewoka deep sand, discovered late in 1925, was actively exploited and in April reached a peak of nearly 40,000 barrels a day. The Deep Rock and North Braman pools, also discovered late in 1925, underwent considerable development in 1926. Neither proved to be of great size, although production in the latter was undoubtedly held back by the fact that one company controlled most of the acreage.

The gas or air-lift method was actively used for the first time in Oklahoma and was instrumental in the rapid rise in production of the Seminole area. Attempts to apply it in other fields met with only fair success.

Petroleum produced in Oklahoma, 1925–26, by districts and months[1]

[Thousands of barrels of 42 U. S. gallons]

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	The year
1925													
Braman	69	68	71	78	103	137	377	640	539	415	238	199	2,934
Bristow-Kelleyville and Depew	373	784	810	778	872	843	851	798	780	807	663	689	9,548
Burbank	1,818	1,595	1,750	1,771	1,763	1,728	1,725	1,683	1,660	1,570	1,460	1,432	19,955
Cromwell	1,027	1,050	1,011	1,286	1,263	1,112	1,038	955	824	786	668	653	11,673
Cushing-Shamrock	724	644	679	648	661	642	664	675	661	684	661	682	8,025
Davenport	------	35	35	77	127	162	244	338	436	486	575	616	3,131
Deep Rock	------	------	------	------	------	------	------	------	------	14	40	71	125
Duncan	189	164	193	183	209	200	199	192	194	200	194	200	2,317
Fox-Graham	416	349	391	359	386	374	385	363	343	371	351	355	4,443
Garber	143	132	164	243	297	300	318	436	1,158	1,228	1,825	1,240	7,484
Glenn-Sapulpa and Kiefer	292	254	281	270	278	270	276	275	267	279	267	275	3,284
Healdton	482	426	473	465	480	462	470	482	459	454	459	464	5,576
Hewitt	504	444	488	456	450	443	442	439	418	431	402	408	5,325
Osage (outside Burbank)	1,121	1,043	1,059	1,034	1,074	975	1,023	1,021	1,021	1,039	1,024	1,036	12,470
Papoose-Gilcrease	1,093	1,022	907	754	711	578	539	480	442	417	420	440	7,803
Thomas	8	5	8	7	38	108	125	113	265	505	506	482	2,170
Tonkawa	2,986	2,554	2,417	2,126	1,936	1,774	1,685	1,600	1,664	1,447	1,270	1,263	22,722
Wewoka	340	286	337	374	456	563	487	458	338	296	264	285	4,484
Other	3,378	3,051	3,330	3,146	3,340	3,162	3,415	3,493	3,356	3,492	3,304	3,334	39,801
	15,463	13,906	14,404	14,055	14,444	13,833	14,263	14,441	14,825	14,921	14,591	14,124	173,270
1926													
Braman:													
North	76	68	75	73	78	81	85	126	233	339	568	564	2,366
South	208	207	350	311	380	323	326	278	247	227	196	160	3,213
Bristow-Kelleyville and Depew	685	616	684	706	715	864	875	806	775	799	780	775	9,080
Burbank	1,386	1,211	1,355	1,274	1,274	1,344	1,338	1,466	1,418	1,524	1,336	1,427	16,353
Cromwell	621	553	586	552	551	523	522	499	474	463	424	425	6,193
Cushing-Shamrock	708	606	658	618	621	601	648	651	617	641	618	634	7,621
Davenport	638	654	686	512	379	310	256	216	179	177	157	146	4,310
Deep Rock	74	71	108	140	108	99	101	98	84	86	102	71	1,142
Duncan	198	181	208	180	180	174	180	176	170	178	173	177	2,175
Fox-Graham	353	329	370	369	358	343	322	338	333	341	324	334	4,114
Garber	787	666	920	1,118	1,206	1,108	1,125	1,002	1,004	856	716	700	11,208
Glenn-Sapulpa and Kiefer	267	244	282	262	285	282	277	268	259	266	255	257	3,204
Healdton	472	424	467	448	471	449	464	465	457	467	452	465	5,501
Hewitt	390	343	382	361	355	336	362	347	335	336	322	332	4,201
Osage (outside Burbank)	982	857	1,006	972	1,012	1,018	1,012	1,050	1,016	1,022	1,025	1,069	12,041
Papoose-Gilcrease	367	344	350	368	358	326	273	272	307	235	211	222	3,633
Seminole-Earlsboro	------	------	------	------	------	------	312	427	625	1,916	3,464	4,483	11,227
Thomas	457	278	216	164	124	80	84	79	70	67	65	57	1,741
Tonkawa	1,357	1,222	1,283	1,131	1,144	1,140	1,155	1,166	1,205	1,147	1,035	882	13,867
Wewoka	397	407	540	1,105	989	874	995	1,020	911	823	744	769	9,574
Other	3,252	3,111	3,787	3,804	3,919	3,799	3,945	3,868	3,747	3,811	3,910	3,934	44,887
	13,675	12,392	14,313	14,468	14,507	14,074	14,657	14,618	14,466	15,721	16,877	17,883	177,651

[1] Monthly estimates of Oil and Gas Journal.

Texas.—The production of crude petroleum in Texas in 1926 established a new record—166,916,000 barrels—an increase of more than 22,000,000 barrels over 1925. This was the largest actual increase in production recorded for any State in 1926.

In Texas the producing fields are widely scattered and differ greatly in character. For the purpose of this discussion, they may be classified by major areas, as follows: North central Texas, east and south central Texas, Panhandle, west Texas, southwest Texas, and the Gulf coast or salt-dome districts.

In 1926 improved prices resulting from a brisk demand by refineries for light oil caused an increase in output in the north Texas area. Drilling was active, and many new fields or extensions were discovered. As in most of the fields of this section, these discoveries were all comparatively small in extent. The most important were the Cook Ranch pool, Shackelford County, the Fry pool, Brown County, and the Hooser pool, Cooke County.

Production in east and south central Texas, or the Balcones fault zone, decreased from 55,219,000 barrels in 1925 to 31,390,000 barrels in 1926. Most of this decrease was in the Mexia-Powell-Wortham district—the output dropped to less than half of that in 1925. The shallow Thrall-Minerva district was the center of considerable activity and showed a material gain in output. In 1926 efforts were as active as ever to prove new fields along or close to the main fault line but met with little success. Only one small field, Nigger Creek, was discovered.

In 1926 the Panhandle field, which includes the producing areas of Hutchinson, Carson, Wheeler, Potter, and Gray Counties, was one of the outstanding fields. Production on January 1 in this field or district was not over 5,000 barrels per day, but in November rose to nearly 170,000 barrels a day. Total production for the year was 25,551,000 barrels and would have been more if the necessary transportation facilities had been available. The percentage of failures in this field was only 4 per cent, a remarkably low average for an area which was not highly regarded before 1926.

In 1926 the west Texas area became the scene of great activity. Seven new pools were discovered and a like number of counties proved for production. The most important of these pools, as nearly as could be judged by early developments, were McElroy, Crane County; Hendricks, Winkler County; and Yates, Pecos County. The last was a remarkable field, in that the majority of the wells had an initial daily production of over 10,000 barrels from a depth of a little over 1,000 feet. Because of recent successes in opening new pools and the great area opened up, west Texas is regarded as the greatest future source of domestic supply.

Production in the southwest Texas fields increased as a result of more drilling and a number of discoveries and extensions to old fields.

In 1926 the Texas Gulf coast experienced a most profitable year with respect to output, although prices showed a weaker tendency. The production was 41,135,000 barrels, a new high figure and a gain of more than 11,000,000 barrels over 1925.

The most important event of the year was the discovery of the deep zones at Spindletop. The development that followed was confined

to less than 40 acres, but the wells almost without exception were large. Spindletop production, therefore, rose from 412,000 barrels in 1925, or an average of slightly more than 1,000 barrels a day, to 13,441,000 barrels in 1926, or nearly 37,000 barrels a day.

Spurred on by the somewhat unexpected events at Spindletop, the operators of the other Gulf coast fields conducted an extensive campaign in an endeavor to find deep flank production in their respective fields. This campaign was only partly successful. Geophysical work with the seismograph and torsion balance was continued throughout the year, and several new salt domes were discovered, a few of which were proved for production. The choice acreage in these new fields was held by a few large companies, and consequently no rapid development was undertaken.

Petroleum produced in Texas, 1917–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Gulf coast (salt-dome pools)																					Rest of State																Total for State
																						East and south central Texas								North central Texas [7]	Panhandle	Southwest Texas [8]	West Texas							
	Batson	Big Creek	Blue Ridge	Boling	Damon Mound	Dayton	Goose Creek	High Island	Hull	Humble	Markham	Moore	Orange	Piedras Pintas	Pierce Junction	Saratoga	Sourlake	South Liberty	Spindletop	West Columbia	Other	Total	Calliham	Luling	Lytton Springs	Mexia [6]	Somerset	Thrall-Minerva	Other	Total				Big Lake	Crane-Crockett-Upton	Westbrook	Other	Total	Total	
1917	693				[1] 124	10	7,300			7,390	127		7			683	4,763		380	(1)	36	21,513				329		177	58	564	10,336								10,900	32,413
1918	635				[1] 283	9	[2] 8,944		245	6,555	65					722	3,408		557	(1)	47	21,470				313		137	48	498	16,782								17,280	38,750
1919	560				191	8	[2] 5,770		1,273	3,706	54					737	2,709		407	5,611	31	21,057				269	43	91	60	463	57,846								58,309	79,366
1920	527		92		379	17	[2] 4,476		3,909	3,607	57					849	2,024		322	9,459	17	25,735				297	162	60	51	570	70,563								71,133	96,868
1921	495		326		666	40	[2] 4,640		8,150	3,004	49		470		1,239	1,129	1,802		344	12,081	6	34,441				6,137	324	52	48	6,561	65,164								71,725	106,166
1922	434	(3)	349		754	29	[2] 4,766		6,546	2,284	35		5,345		1,020	713	1,675		289	11,126	5	35,370				34,790	672	37	35	35,534	47,037		733						83,314	118,684
1923	403	(3)	287		628	35	[2] 6,026		7,300	2,275	21		4,649		313	626	1,906		326	5,994	32	30,821		2,248		50,827	1,030	247	38	54,390	43,896		1,786	12		118		130	100,202	131,023
1924	464	293	278		520	36	[2] 3,967		7,074	2,224	66		3,958		154	543	1,588		359	4,536	22	26,082	187	11,134		49,272	1,109	235	59	61,996	42,487	272	2,215	1,056		414		1,470	108,440	134,522
1925	432	310	313	40	416	20	[2] 3,464	121	6,944	1,864	41		4,816	17	265	514	1,444	4,416	412	4,031	5	29,885	98	8,979	2,603	42,353	873	255	58	55,219	46,013	1,132	2,688	8,900		811		9,711	114,763	144,648
1926	456	520	486	1,175	341	(3)	[2] 3,501	60	7,058	1,568	51	75	3,458	93	948	482	2,004	1,992	13,441	[4] 3,404	[5] 22	41,135	52	7,699	1,783	20,494	[9] 791	535	36	31,390	49,854	25,551	4,150	10,937	2,441	[10] 1,372	86	14,836	125,781	166,916

[1] Damon Mound includes West Columbia.
[2] Includes Barbers Hill.
[3] Included under "Other."
[4] Includes 207,000 barrels produced in Nash.
[5] Brenham and Dayton.
[6] Includes Corsicana, Nigger Creek, Powell, Richland, Wortham, and smaller fields in Falls, Freestone, Limestone, and Navarro Counties.
[7] Includes the districts in and between Wilbarger, Wichita, Clay, Montague, and Cooke Counties on the north and Coleman, Brown, and Comanche Counties on the south.
[8] Includes fields in Jim Hogg, Webb, and Zapata Counties and Duval County, except salt-dome field at Piedras Pintas.
[9] Includes Hondo.
[10] Includes Chalk and other small fields in Howard and Mitchell Counties.

Petroleum produced in coastal Texas salt-dome pools, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
Batson	36	32	40	37	36	37	33	44	36	40	26	24	421	11	432
Big Creek	10	12	11	17	31	14	25	30	29	31	31	26	267	43	310
Blue Ridge	12	16	30	36	51	29	22	16	14	13	14	22	275	38	313
Boling												40	40		40
Damon Mound	38	29	32	31	30	34	30	30	31	29	26	27	367	49	416
Dayton	1	2	1	1	1	2	1	1	2	2	2	1	17	3	20
Goose Creek [1]	270	247	268	267	317	326	281	272	263	334	267	256	3,368	96	3,464
High Island	1		1	1	12	21	19	14	5	26	11	1	112	9	121
Hull	422	396	759	705	660	582	562	566	505	496	488	458	6,599	345	6,944
Humble	175	151	172	165	164	156	152	147	137	131	144	141	1,835	29	1,864
Markham	5	5	6	3	4	3	2	3	3	5	1	3	43	−2	41
Orange	270	261	313	382	402	368	525	440	440	457	390	437	4,685	131	4,816
Piedras Pintas			1				1				1	12	15	2	17
Pierce Junction	33	22	17	15	13	13	11	10	20	14	24	50	242	23	265
Saratoga	23	29	42	49	26	28	28	26	79	26	24	23	403	111	514
Sourlake	114	114	126	115	118	121	119	122	113	119	116	106	1,403	41	1,444
South Liberty	8	7	243	351	636	506	575	439	459	389	308	278	4,199	217	4,416
Spindletop	32	29	36	37	37	33	34	33	34	33	36	35	409	3	412
West Columbia	359	331	359	337	346	335	321	323	304	292	295	271	3,873	158	4,031
Other														5	5
	1,809	1,683	2,457	2,549	2,884	2,608	2,741	2,516	2,474	2,437	2,204	2,211	28,573	1,312	29,885
1926															
Batson	32	37	34	38	40	36	35	34	37	42	37	41	443	13	456
Big Creek	28	40	35	28	27	28	70	58	49	37	43	57	500	20	520
Blue Ridge	17	24	15	17	25	19	40	32	36	48	69	109	451	35	486
Boling	144	118	90	157	137	65	67	75	75	68	64	79	1,139	36	1,175
Damon Mound	25	24	24	24	26	22	34	22	21	25	26	27	300	41	341
Goose Creek [1]	278	274	266	271	306	317	352	343	327	260	226	225	3,445	56	3,501
High Island		12	2	1	15	1	1	1	5	4	2	1	45	15	60
Hull	486	517	550	602	584	529	526	536	611	668	608	559	6,776	282	7,058
Humble	126	152	121	138	127	123	135	128	130	126	113	110	1,529	39	1,568
Markham	2	1	3	2	2	2	3	3	3	6	3	15	45	6	51
Moore	7	10	5	3	5	20	8	2	3		1		64	11	75
Orange	423	340	410	339	323	266	256	244	216	193	195	193	3,398	60	3,458
Piedras Pintas	24	21	7	6	6	2	5	3	1	2	4	11	92	1	93
Pierce Junction	37	36	53	54	52	47	70	93	92	113	162	117	926	22	948
Saratoga	27	22	22	22	25	23	37	47	21	22	36	23	327	155	482
Sourlake	133	119	126	122	162	150	164	201	260	211	175	154	1,977	27	2,004
South Liberty	235	211	195	156	171	161	156	140	114	129	137	126	1,931	61	1,992
Spindletop	124	116	71	80	152	135	872	2,067	2,165	2,290	2,518	2,839	13,429	12	13,441
West Columbia	274	239	281	265	233	282	322	355	306	276	278	284	3,395	9 [2]	3,404
Other [3]	1	1	1	1	1	1	1	1		2		1	11	11	22
	2,423	2,314	2,311	2,326	2,419	2,229	3,154	4,385	4,472	4,522	4,697	4,971	40,223	912	41,135

[1] Includes Barbers Hill.
[2] Includes 207,000 barrels produced in Nash.
[3] Brenham and Dayton.

Petroleum produced in Texas (exclusive of salt-dome fields), 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
East and south central Texas:															
Calliham	10	12	9	8	9	7	10	8	5	7	8	5	98		98
Luling	819	770	833	727	781	722	678	739	685	719	611	642	8,726	253	8,979
Lytton Springs			53	239	359	336	380	335	314	283	279	279	2,578	25	2,603
Mexia	6,255	4,469	4,818	4,118	3,940	3,303	3,088	2,873	2,561	2,467	2,209	2,053	42,154	199	42,353
Somerset	86	70	74	71	74	70	73	73	71	67	74	68	871	2	873
Thrall-Minerva	19	17	22	21	23	21	23	23	22	22	21	21	255		255
Other	5	5	5	5	4	5	4	4	4	4	4	3	52	6	58
	7,194	5,343	5,761	5,003	5,070	4,487	4,212	4,100	3,683	3,600	3,210	3,071	54,734	485	55,219
North central Texas	3,506	3,447	4,020	3,953	4,109	3,900	4,149	3,841	3,686	3,839	3,753	3,833	46,036	−23	46,013
Panhandle	24	112	73	103	98	122	105	101	108	100	109	110	1,165	−33	1,132
Southwest Texas	252	221	227	254	229	244	229	209	211	190	232	185	2,683	5	2,688
West Texas:															
Big Lake	295	285	378	525	887	860	903	947	960	940	929	987	8,896	4	8,900
Westbrook	50	43	52	44	58	63	67	89	73	75	78	89	781	30	811
	345	328	430	569	945	923	970	1,036	1,033	1,015	1,007	1,076	9,677	34	9,711
	11,321	9,451	10,511	9,882	10,451	9,676	9,665	9,287	8,721	8,744	8,311	8,275	114,295	468	114,763
1926															
East and south central Texas:															
Calliham	6	5	4	5	4	4	4	5	4	3	4	4	52		52
Luling	696	623	687	674	664	689	671	635	597	581	555	570	7,642	57	7,699
Lytton Springs	237	221	217	176	158	143	135	120	101	99	88	83	1,778	5	1,783
Mexia	1,969	1,776	1,844	1,706	1,678	1,586	1,636	1,763	1,803	1,691	1,545	1,500	20,497	−3	20,494
Somerset	72	60	69	62	80	61	64	62	68	61	59	73	791		791

Thrall-Minerva	47	40	43	41	43	41	45	45	45	47	49	49	535	----	535
Other	3	3	4	4	3	2	3	2	3	3	2	3	35	1	36
	3,030	2,728	2,868	2,668	2,630	2,526	2,558	2,632	2,621	2,485	2,302	2,282	31,330	60	31,390
North central Texas	3,706	3,361	3,867	3,860	3,991	3,993	4,342	4,339	4,290	4,648	4,664	4,740	49,801	53	49,854
Panhandle	100	99	124	378	1,031	1,489	2,074	2,873	3,441	4,627	4,530	4,590	25,356	195	25,551
Southwest Texas	187	183	207	266	257	351	446	505	451	440	415	413	4,121	29	4,150
West Texas:															
Big Lake	1,001	833	991	1,019	972	903	888	863	844	870	871	882	10,937	----	10,937
Crane-Crockett-Upton	----	----	7	8	32	46	147	206	318	449	522	640	2,375	66	2,441
Westbrook	88	77	94	102	107	96	111	111	104	126	134	137	1,287	85	1,372
Other	----	----	----	----	----	----	----	----	12	15	17	24	68	18	86
	1,089	910	1,092	1,129	1,111	1,045	1,146	1,180	1,278	1,460	1,544	1,683	14,667	169	14,836
	8,112	7,281	8,158	8,301	9,020	9,404	10,566	11,529	12,081	13,660	13,455	13,708	125,275	506	125,781

Wyoming.—Production in Wyoming continued to decline in 1926, when the total output amounted to 25,776,000 barrels, as compared with 29,173,000 barrels in 1925. Most of the decrease was in the largest field, Salt Creek, where production dropped nearly 3,500,000 barrels. The Lost Soldier-Ferris field, by virtue of an 18 per cent gain in output, made the best showing of the major producing fields.

Perhaps the most important event of the year was the discovery of oil in the Sundance and Morrison sands at Salt Creek. Although wildcatting was as extensive as ever, only a few fields of minor importance were discovered.

Petroleum produced in Wyoming, 1917–1926, by districts

[Thousands of barrels of 42 U. S. gallons]

Year	Big Muddy	Byron-Greybull-Torchlight	Elk Basin	Ferris	Grass Creek	Hamilton Dome-Warm Springs	La Barge	Lance Creek	Lander-Dallas-Derby Dome	Lost Soldier
1917	665	62	1,530	----------	2,756	----------	----------	----------	[1] 50	----------
1918	3,082	45	1,067	----------	2,951	----------	----------	----------	48	----------
1919	3,104	27	740	[2]	2,049	----------	----------	461	62	[2] 167
1920	2,083	69	732	(-)	1,573	57	----------	353	84	[2] 135
1921	1,927	80	681	[2]	1,435	67	----------	346	119	[2] 524
1922	1,506	70	652	[2]	1,784	111	----------	282	149	[2] 751
1923	1,527	57	634	[2]	1,589	216	----------	363	137	[2] 1,551
1924	1,272	33	409	42	1,113	239	----------	786	133	1,733
1925	1,223	30	314	33	1,240	264	----------	360	152	1,713
1926	1,215	[3]	273	[2]	1,025	319	70	540	165	[2] 2,059

Year	Mule Creek	Notches	Osage	Pilot Butte	Poison Spider-South Casper	Rex Lake	Rock Creek	Salt Creek	Teapot	Other	Total
1917	----------	----------	----------	[1]	----------	----------	----------	3,911	----------	4	8,978
1918	----------	----------	----------	62	----------	----------	----------	5,337	----------	4	12,596
1919	----------	----------	----------	91	----------	----------	242	6,225	----------	4	13,172
1920	182	----------	16	69	----------	----------	1,370	10,090	----------	18	16,831
1921	68	----------	176	46	----------	----------	1,681	12,172	----------	11	19,333
1922	168	----------	182	38	----------	----------	1,728	19,248	37	9	26,715
1923	----------	61	178	29	[3]	----------	1,429	35,770	1,156	88	44,785
1924	178	39	146	29	229	41	1,181	30,874	1,004	17	39,498
1925	129	35	109	25	297	20	1,087	21,445	632	65	29,173
1926	----------	34	113	20	[4] 376	53	1,029	18,010	426	49	25,776

[1] Pilot Butte included with Lander-Dallas.
[2] Ferris included with Lost Soldier.
[3] Included under "Other."
[4] Includes Iron Creek and Simpson Ridge.

Petroleum produced in Wyoming, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

District	Petroleum transported from producing properties													Oil consumed on leases plus net change in producers' stocks, Jan. 1–Dec. 31	Production
	January	February	March	April	May	June	July	August	September	October	November	December	The year		
1925															
Big Muddy	98	90	103	97	103	104	107	107	105	105	98	103	1,220	3	1,223
Elk Basin	23	24	27	27	26	26	26	28	27	26	22	20	302	12	314
Grass Creek	32	79	130	129	137	130	145	119	96	87	80	82	1,246	−6	1,240
Hamilton Dome		44	17	17	21	30	11	14	18	33	28	26	259	5	264
Lance Creek	24	30	57	25	22	22	21	20	20	19	40	88	388	−28	360
Lander-Dallas-Derby Dome	10	11	12	13	12	11	11	13	14	12	11	13	143	9	152
Lost Soldier-Ferris	134	86	100	203	250	156	152	157	159	118	103	120	1,738	8	1,746
Mule Creek				22	33	23	23	20	3				124	5	129
Osage	9	10	12	10	11	10	10	6	5	5	9	10	107	2	109
Pilot Butte	1					5	9	2	2	1	1		21	4	25
Poison Spider-South Casper	33	11	11	14	22	25	34	40	28	31	26	24	299	−2	297
Rock Creek	94	86	96	91	94	87	93	85	86	92	92	87	1,083	4	1,087
Salt Creek	1,783	1,664	1,922	1,808	1,656	1,642	1,774	1,883	1,923	1,894	1,787	1,732	21,468	−23	21,445
Teapot	62	57	63	56	55	51	49	49	48	49	47	46	632		632
Other	4	4	5	3	8	14	22	9	6	17	15	17	124	26	150
	2,307	2,196	2,555	2,515	2,450	2,336	2,487	2,552	2,540	2,489	2,359	2,368	29,154	19	29,173
1926															
Big Muddy	100	96	107	103	109	105	102	101	100	98	93	90	1,204	11	1,215
Elk Basin	19	17	21	19	20	26	26	27	26	25	25	22	273		273
Grass Creek	81	75	81	80	86	89	97	93	86	87	84	86	1,025		1,025
Hamilton Dome	42	34	49	25	30	40	39	35	26				320	−1	319
La Barge	6	5	5	3	6	5	4	7	5	7	3	8	64	6	70
Lance Creek	77	62	62	56	48	44	42	37	34	32	24	23	541	−1	540
Lander-Dallas	14	11	13	10	11	11	14	16	18	17	14	13	162	3	165
Lost Soldier-Ferris	146	133	160	151	159	166	159	85	220	121	223	168	1,891	168	2,059
Notches						9	9	8	7	1			34		34
Osage	9	10	10	10	10	9	10	9	9	8	8	9	111	2	113
Poison Spider-South Casper-Iron Creek	13	10	15	22	25	25	54	44	24	27	24	25	308	11	319
Rex Lake					4	7	9	8	8	7	7	7	57	−4	53
Rock Creek	88	79	91	90	91	86	86	86	84	86	79	84	1,030	−1	1,029
Salt Creek	1,824	1,650	1,707	1,611	1,581	1,493	1,413	1,448	1,351	1,388	1,292	1,235	17,903	17	18,010
Simpson Ridge	8	7	6	5	5	6	5	4	4	4	3	1	58	−1	57
Teapot	40	39	42	39	38	36	35	34	33	29	30	31	426		426
Other	1	1	3	2	2	13	3	3	4	7	2	2	43	26	69
	2,468	2,229	2,372	2,226	2,225	2,170	2,107	2,045	2,039	1,944	1,911	1,804	25,540	236	25,776

Other States.—The other States ranked as follows as producers of petroleum in 1926:

Petroleum produced in other States in 1926

[Thousands of barrels of 42 U. S. gallons]

State	Rank	Production	Percentage of increase or decrease from 1925	State	Rank	Production	Percentage of increase or decrease from 1925
Pennsylvania	8	8,961	+10.7	New York	15	1,956	+15.4
Illinois	9	7,760	−1.3	Indiana	17	808	−2.5
Ohio	11	7,272	+.8	Michigan	18	94	+2,250.0
Kentucky	12	6,274	−7.2	Tennessee	19	43	+79.2
West Virginia	13	5,946	+3.2				

The total production of the nine States given above for 1926 was 39,114,000 barrels, a gain over 1925 of 868,000 barrels, or 2 per cent. Of these States only Illinois, Indiana, and Kentucky showed no increase in production in 1926 as compared with 1925. Most of the increased output came from the so-called "Pennsylvania grade crude" area, which includes the States of New York, Pennsylvania, West Virginia, and eastern Ohio.

Activity in Pennsylvania and New York again centered around the Bradford and Allegany fields. Nearly 1,500 oil wells were completed in the Bradford field alone in 1926, which, with the widespread use of flooding and compressed air, resulted in a material gain in production. There was little wildcatting elsewhere in Pennsylvania and in West Virginia, due to unsatisfactory prices, which did not rally to the same extent as in the case of other grades of crude. Development work in Pennsylvania was confined to Greene County, where important discoveries had been made in 1925.

Several promising areas were uncovered in Tennessee in 1926, but development was retarded owing to lack of transportation facilities.

Generally higher prices prevailed in the Indiana, Illinois, and Kentucky fields, with the result that, although production was lower, profits were greater.

The Saginaw field in Michigan, discovered in 1925, was actively developed in 1926, with 95 completions recorded. The possibilities of deeper production in this field were considerably enhanced by the encouraging shows encountered in several deep tests.

Petroleum produced in Kentucky, 1924–1926, by counties, in barrels [1]

County	1924	1925	1926	County	1924	1925	1926
Allen	371,460	304,579	280,228	Logan	----------	564	661
Barren	108,457	253,561	341,812	Magoffin	1,105,378	890,117	780,901
Bath	17,685	16,805	14,872	Martin	12	3	11
Boyd	1,242	992	712	McCreary	4,405	3,751	6,418
Clinton	1,363	11,031	11,894	Menifee	3,156	1,936	1,573
Cumberland	81,217	69,805	45,317	Monroe	48,491	22,621	6,788
Daviess	----------	12,321	22,487	Morgan	9,410	8,148	6,999
Elliott	7,271	8,240	9,727	Ohio	78,631	165,040	362,909
Estill	498,957	436,483	401,876	Owsley	10,879	16,167	13,605
Floyd	14,126	7,873	13,494	Powell	264,483	212,582	172,688
Hancock	36,657	33,578	30,999	Russell	9,409	1,917	----------
Hopkins	12,912	15,073	14,692	Simpson	11,252	8,953	7,089
Jackson	582	583	1,239	Warren	580,225	489,646	408,807
Johnson	1,178,675	1,026,322	968,284	Wayne	126,139	134,142	108,229
Knott	2,922	2,634	1,876	Wolfe	57,557	52,538	53,969
Lawrence	512,286	665,795	688,124				
Lee	2,236,840	1,775,004	1,449,526		7,392,193	6,648,854	6,227,806
Lincoln	114	50	----------	Bureau of Mines	7,407,000	6,759,000	6,274,000

[1] Kentucky State Tax Commission.

Petroleum produced in Pennsylvania, 1924–1926, by counties, in barrels [1]

County	1924	1925	1926	County	1924	1925	1926
Allegheny	467,265	453,648	422,797	McKean	[2] 2,374,775	[2] 2,575,089	[2] 2,962,698
Armstrong	21,350	20,093	19,718	Mercer	13,503	13,804	14,401
Beaver	91,973	83,908	84,296	Potter	10,011	11,686	7,395
Butler	735,900	846,151	689,782	Tioga	6,836	5,916	2,441
Clarion	203,685	208,807	209,965	Venango	1,236,568	1,184,221	1,161,924
Crawford	56,613	57,637	64,523	Warren	326,852	294,597	313,808
Elk	100,701	93,546	88,419	Washington	478,483	455,554	449,493
Forest	87,369	131,162	137,078	Westmoreland	257	186	----------
Greene	249,871	302,938	439,576				
Jefferson	8,436	8,527	21,167		[2] 6,494,663	[2] 6,770,007	[2] 7,108,829
Lawrence	24,215	22,537	19,348	Bureau of Mines	[2] 7,486,000	[2] 8,097,000	[2] 8,961,000

[1] Department of Internal Affairs, Pennsylvania.

[2] The figures of the Bureau of Mines for 1924 include 771,000 barrels reported for McKean County which is not included in the figures of the Pennsylvania Department of Internal Affairs; the differences in the totals for 1925 and 1926 are largely for the same county.

WORLD'S PRODUCTION

The world's production of crude petroleum in 1926 amounted to 1,098,389,000 barrels, an increase over 1925 of 29,427,000 barrels, or 3 per cent. Of this increase the United States accounted for approximately 7,000,000 barrels, as compared with an increase in other countries of about 22,000,000 barrels. In 1925 the situation was reversed—the increase in the United States far exceeded that of the rest of the world. Mexico recorded another decrease of approximately 25,000,000 barrels, but maintained her rank as the second largest producing country despite a material gain on the part of the third ranking nation, Russia. Venezuela, Rumania, and Colombia also made notable gains in output in 1926.

Mexico.—The history of the petroleum industry in Mexico in 1926 was not unlike that of 1925. Production showed a marked decrease as a result of the natural decline of the old wells and the failure to uncover new producing areas. The major part of the decrease in output was recorded in the heavy oil of the northern fields. The spirit of uncertainty resulting from the new petroleum law again had a deleterious effect on exploratory work, and the number of wildcats drilled during the year was very small.

Russia.—Production in Russia assumed nearly pre-war levels in 1926, when it amounted to 64,311,000 barrels, an increase over 1925 of about 11,900,000 barrels and the largest annual increase ever reported for this country. Most of the increase in production was in the Grozny, Surakhani, Bibi-Eibat, and Ramani fields. Production methods and transportation facilities improved considerably, but the refining industry was virtually at a standstill.

Venezuela.—Production in Venezuela in 1926 amounted to 37,226,000 barrels, as compared with 19,687,000 barrels in 1925. These figures represent an increase of over 17,500,000 barrels, the largest increase from point of volume recorded for any of the producing countries in 1926. The increased output resulted mainly from a uniformly successful drilling campaign in the old fields. Two new fields, Lagunillas and Benitez, were developed and several more indicated during the year.

Persia.—Persia again showed a small increase in annual production, although it dropped from fourth place in 1925 to fifth in 1926.

Colombia.—Colombia produced 6,444,000 barrels of crude petroleum in 1926 as compared with 1,007,000 barrels produced in 1925. This phenomenal increase was made possible by the completion of a pipe-line from the fields to the coast.

World's production of crude petroleum,

[Thousands of barrels

Year	Rumania	United States	Italy	Canada	Russia [1]	Poland (Galicia)	Japan and Taiwan	Germany	India	Netherland East Indies	Peru	Mexico	Argentina
1857–60	19	502	(2)	------	------	------	------	------	------	------	------	------	------
1861	17	2,114	(2)	------	------	------	------	------	------	------	------	------	------
1862	23	3,057	(2)	12	------	------	------	------	------	------	------	------	------
1863	28	2,611	(2)	83	41	------	------	------	------	------	------	------	------
1864	33	2,116	(2)	90	65	------	------	------	------	------	------	------	------
1865	39	2,498	2	110	67	------	------	------	------	------	------	------	------
1866	42	3,598	1	175	83	------	------	------	------	------	------	------	------
1867	51	3,347	1	190	120	------	------	------	------	------	------	------	------
1868	56	3,646	(2)	200	88	------	------	------	------	------	------	------	------
1869	59	4,215	(2)	220	202	------	------	------	------	------	------	------	------
1870	84	5,261	(2)	250	204	------	------	------	------	------	------	------	------
1871	90	5,205	(2)	270	165	------	------	------	------	------	------	------	------
1872	91	6,293	(2)	308	185	------	------	------	------	------	------	------	------
1873	104	9,894	(2)	365	475	------	------	------	------	------	------	------	------
1874	103	10,927	1	169	583	150	------	------	------	------	------	------	------
1875	108	8,788	1	220	697	158	5	------	------	------	------	------	------
1876	111	9,133	3	312	1,321	164	7	------	------	------	------	------	------
1877	108	13,350	3	312	1,801	170	10	------	------	------	------	------	------
1878	109	15,397	4	312	2,401	176	18	------	------	------	------	------	------
1879	110	19,914	3	575	2,761	215	23	------	------	------	------	------	------
1880	115	26,286	2	350	3,001	229	26	9	------	------	------	------	------
1881	122	27,661	1	275	3,601	287	17	29	------	------	------	------	------
1882	136	30,350	2	275	4,538	330	15	58	------	------	------	------	------
1883	139	23,450	2	250	6,002	365	20	27	------	------	------	------	------
1884	211	24,218	3	250	10,805	408	28	46	------	------	------	------	------
1885	193	21,859	2	250	13,925	465	30	41	------	------	------	------	------
1886	168	28,065	2	584	18,006	306	38	74	------	------	------	------	------
1887	182	28,283	1	526	18,368	344	29	74	------	------	------	------	------
1888	219	27,612	1	695	23,049	467	37	85	------	------	------	------	------
1889	298	35,164	1	705	24,609	515	53	68	94	------	------	------	------
1890	383	45,824	3	795	28,691	659	52	108	118	------	------	------	------
1891	488	54,293	8	755	34,573	631	53	109	190	------	------	------	------
1892	593	50,515	18	780	35,775	646	69	101	242	------	------	------	------
1893	535	48,431	19	798	40,457	693	106	100	299	600	------	------	------
1894	508	49,344	21	829	36,375	949	173	123	327	688	------	------	------
1895	576	52,892	26	726	46,140	1,453	170	121	372	1,216	------	------	------
1896	543	60,960	18	727	47,221	2,444	237	145	430	1,427	47	------	------
1897	571	60,476	14	710	54,399	2,226	262	166	546	2,552	71	------	------
1898	776	55,364	15	758	61,610	2,376	319	184	542	2,964	71	------	------
1899	1,426	57,071	16	808	65,955	2,314	539	192	941	1,796	89	------	------
1900	1,629	63,621	12	913	75,780	2,347	871	358	1,079	2,253	274	------	------
1901	1,678	69,389	16	757	85,168	3,251	1,117	314	1,431	4,014	275	10	------
1902	2,060	88,767	19	531	80,540	4,142	996	354	1,617	2,430	287	40	------
1903	2,763	100,461	18	487	75,591	5,235	1,209	446	2,510	5,770	278	75	------
1904	3,599	117,081	26	553	78,537	5,947	1,219	637	3,385	6,508	290	126	------
1905	4,421	134,717	44	634	54,960	5,766	1,347	561	4,137	7,850	373	251	------
1906	6,378	126,494	54	569	58,897	5,468	1,564	579	4,016	8,181	531	502	------
1907	8,118	166,095	60	789	61,851	8,456	1,718	757	4,344	9,983	751	1,005	(2)
1908	8,252	178,527	51	528	62,187	12,612	1,871	1,009	5,047	10,283	945	3,933	12
1909	9,327	183,171	42	421	65,970	14,933	1,887	1,019	6,677	11,042	1,411	2,714	18
1910	9,724	209,557	51	316	70,337	12,673	1,829	1,032	6,138	11,031	1,258	3,634	20
1911	11,108	220,449	75	291	66,184	10,519	1,737	1,017	6,451	12,173	1,465	12,553	13
1912	12,976	222,935	54	243	68,019	8,535	1,659	1,031	7,117	10,846	1,752	16,558	47
1913	13,555	248,446	47	228	62,834	7,818	1,940	857	7,930	11,172	2,071	25,696	131
1914	12,827	265,763	40	215	67,020	6,436	2,636	781	7,410	11,422	1,837	26,235	276
1915	12,030	281,104	44	215	68,548	5,352	2,928	703	8,202	11,920	2,579	32,911	513
1916	8,945	300,767	51	198	65,817	6,587	2,963	656	8,491	12,547	2,593	40,546	867
1917	3,721	335,316	41	214	63,072	6,228	2,861	642	8,079	13,180	2,577	55,293	1,218
1918	8,730	355,928	35	305	27,168	6,032	2,441	270	8,188	12,778	2,527	63,828	1,353
1919	6,618	378,367	35	241	31,752	6,096	2,238	265	8,736	15,508	2,628	87,073	1,331
1920	7,435	442,929	35	196	25,430	5,607	2,221	246	8,375	17,529	2,817	157,069	1,651
1921	8,368	472,183	32	188	28,968	5,167	2,233	274	8,734	16,958	3,699	193,398	2,036
1922	9,843	557,531	31	179	35,692	5,227	2,055	319	8,529	17,066	5,314	182,278	2,866
1923	10,867	732,407	34	170	39,147	5,402	1,804	346	8,406	19,870	5,699	149,585	3,400
1924	13,369	713,940	45	161	45,355	5,657	1,814	406	8,416	20,473	8,379	139,678	4,639
1925	16,650	763,743	70	332	52,448	5,960	1,915	541	8,274	21,422	9,252	115,515	6,336
1926	23,314	770,874	48	364	64,311	5,844	1,900	653	8,728	21,242	10,762	90,421	7,952
	247,872	9,440,546	1,304	26,257	2,169,942	202,437	53,309	17,933	174,548	336,694	72,902	1,400,927	34,679

[1] Exclusive of Sakhalin, which is shown separately.

[2] Estimated.

1857–1926, by years and countries

of 42 U. S. gallons]

Trinidad	Egypt	Persia	Sarawak	Algeria	Ecuador	Venezuela	France	England	Czechoslovakia	Sakhalin (Russian)	Colombia	Other countries[2]	Total	Percentage produced by United States
													521	96
													2,131	99
													3,092	99
													2,763	94
													2,304	92
													2,716	92
													3,899	92
													3,709	90
													3,990	91
													4,696	90
													5,799	91
													5,730	91
													6,877	92
													10,838	91
													11,933	92
													9,977	88
													11,051	83
													15,754	85
													18,417	84
													23,601	84
													30,018	88
													31,993	86
													35,704	85
													30,255	78
													35,969	67
													36,765	59
													47,243	59
													47,807	59
													52,165	53
													61,507	57
													76,633	60
													91,100	60
													88,739	57
													92,038	53
													89,337	55
													103,692	51
													114,199	53
													121,993	50
													124,979	44
													131,147	44
													149,137	43
												20	167,440	41
												26	181,809	49
												36	194,879	52
												40	217,948	54
												30	215,091	63
												30	213,263	59
												30	263,957	63
[3]												30	285,287	63
57												20	298,709	61
143												20	327,763	64
285	21											20	344,361	64
437	214											20	352,443	63
504	98	1,857	141									20	385,345	64
644	753	2,910	318	1								20	407,544	65
750	212	3,615	392	4								10	432,033	65
929	404	4,477	629	8								25	457,500	66
1,602	943	7,147	542	9	57	120						29	502,891	67
2,082	1,935	8,623	504	7	[2] 60	333	[4] 363					25	503,515	71
1,841	1,517	10,139	596	5	[2] 60	425	334	2	48			20	555,875	68
2,083	1,042	12,230	1,020	4	[2] 60	457	356	3	69			20	688,884	64
2,354	1,255	16,673	1,411	3	[2] 60	1,433	389	3	94	2		20	765,935	62
2,445	1,188	22,247	2,849	9	[2] 60	2,201	496	1	120	7	323	22	858,898	65
3,051	1,054	25,230	3,940	9	87	4,201	494	1	74	9	424	24	1,015,735	72
4,057	1,122	32,373	4,163	11	[2] 100	9,042	497	2	76	80	445	24	1,014,324	70
4,387	1,226	35,038	4,257	12	160	19,687	459	3	158	87	1,007	23	1,068,962	71
5,278	1,188	35,842	4,942	9	214	37,226	478	3	150	181	6,444	21	1,098,389	70
32,929	14,172	218,402	25,704	91	918	75,125	3,866	18	789	366	8,643	625	14,560,998	65

[1] Less than one thousand. [4] Production in previous years credited to Germany.

World's production of petroleum in 1926, by countries, compared with 1925

[Compiled by L. M. Jones, of the Bureau of Mines]

Country	1926				1925			
	Thousands of barrels of 42 U. S. gallons	Thousands of metric tons	Thousands of cubic meters	Percentage of total by volume	Thousands of barrels of 42 U. S. gallons	Thousands of metric tons	Thousands of cubic meters	Percentage of total by volume
United States	770,874	106,474	122,555	70.2	763,743	104,622	121,422	71.4
Mexico	90,421	13,758	14,375	8.2	115,515	17,626	18,365	10.8
Russia [1]	64,311	8,899	10,224	5.9	52,448	7,295	8,388	4.9
Venezuela	37,226	5,454	5,918	3.4	19,687	2,884	3,130	1.8
Persia	35,842	4,759	5,698	3.3	35,038	4,652	5,571	3.3
Rumania	23,314	3,244	3,707	2.1	16,650	2,317	2,647	1.6
Netherland East Indies	21,242	3,018	3,377	1.9	21,422	3,066	3,406	2.0
Peru	10,762	1,427	1,711	1.0	9,252	1,220	1,471	.9
India, British	8,728	1,225	1,388	.8	8,274	1,162	1,315	.8
Argentina	7,952	1,159	1,264	.7	6,336	924	1,007	.6
Colombia	6,444	920	1,024	.6	1,007	144	160	.1
Poland	5,844	796	929	.5	5,960	812	948	.5
Trinidad	5,278	737	839	.5	4,387	610	697	.4
British Borneo—Sarawak	4,942	712	786	.4	4,257	613	677	.4
Japan and Taiwan	1,900	264	302	.2	1,915	266	304	.2
Egypt	1,188	173	189	.1	1,226	179	195	.1
Germany	653	95	104		541	79	86	
France	478	68	76		459	66	73	
Canada	364	46	58		332	42	53	
Ecuador	214	30	34		160	23	25	
Sakhalin, Russian	181	28	29		87	14	14	
Czechoslovakia	150	22	24		158	23	25	
Italy	48	5	8	.2	70	8	11	.2
Algeria	9				12			
Barbados	9				9			
Cuba	2	5	5		4	6	6	
England	3				3			
Other countries [2]	10				10			
	1,098,389	153,318	174,624	100.0	1,068,962	148,653	169,996	100.0

[1] Exclusive of Sakhalin, which is shown separately below. [2] Estimated.

PRODUCTION OF PETROLEUM IN FOREIGN COUNTRIES IN 1926, BY FIELDS

Petroleum produced in certain foreign countries in 1926, by Provinces, districts, or fields

[Compiled by L. M. Jones, of the Bureau of Mines]

	Barrels of 42 U. S. gallons	Metric tons
Argentina:		
Comodoro Rivadavia	7,723,341	1,127,500
Plaza Huincul	229,142	31,000
	7,952,483	1,158,500
Canada:		
Alberta	216,050	26,100
New Brunswick	10,544	1,400
Ontario—		
Petrolia	56,170	7,800
Oil springs	38,350	5,100
Other fields	43,330	5,900
	364,444	46,300
Egypt:		
Abu-Durba	6,687	1,034
Gemsah	4,555	596
Hurghada	1,176,297	171,322
	1,187,539	172,952
France:		
Alsace (Pechelbronn)	435,618	62,347
Gabian	42,227	5,950
	477,845	68,297
Germany:		
Hildesheim	22,890	3,344
Lüneberg	629,699	91,994
	652,589	95,338
Italy:		
Abruzzi—Chieti	704	80
Emilia—		
Parma	9,788	1,040
Pavia	2,207	245
Piacenza	28,424	3,020
Valle Latina—Caserta	6,430	1,020
	47,553	5,405

Petroleum produced in certain foreign countries in 1926, by Provinces, districts, or fields—Continued

	Barrels of 42 U. S. gallons	Metric tons
Mexico:		
Heavy oil—		
Altamira	711,387	110,621
Ebano	19,334,095	3,014,185
El Limón	926,605	143,346
Pánuco—		
Cacalilao	18,440,117	2,867,438
Other	17,037,704	2,649,363
San Jeronimo	170,642	26,364
Topila	1,472,112	225,380
	58,092,662	9,036,697
Light oil—		
Alazán	330,175	48,140
Cerro Viejo	4,050,471	588,128
Chiconcillo y San Miguel	192,380	28,299
Concepción	6,869	1,003
Dos Bocas	117,755	17,192
Filisola	1,277,851	179,666
Furbero	135,134	19,257
Isleta de Capoacan	4,013	586
Ixhuatlán	384	56
La Labor	1,308	191
Potrero del Llano	698,196	101,867
Sarlat	132	17
Tepetate, Chinampa, Amatlan, Zacamixtle	7,819,476	1,146,335
Tierra Amarilla	61,177	8,938
Tierra Blanca, Chapapote, Alamo	10,557,954	1,542,517
Tecuanapa	15,442	2,255
Toteco, Cerro Azul	7,059,594	1,037,054
	32,328,311	4,721,501
	90,420,973	13,758,198
Netherland East Indies:		
Borneo	13,355,240	1,975,335
Ceram	286,382	41,206
Java	1,631,059	225,160
Sumatra	5,969,086	776,214
	21,241,767	3,017,915
Peru:		
La Brea-Pariñas	8,632,127	1,146,044
Lobitos	1,412,363	186,137
Restin, Cabo Blanco, and El Alto	641,517	85,052
Zorritos	76,386	10,026
	10,762,393	1,427,259
Poland:		
Cracow	1,736	234
Drohobycz	4,966,054	677,682
Jaslo	533,965	71,992
Stanislaw	342,510	46,179
	5,844,265	796,087
Rumania:		
Bacau	389,632	54,221
Buzau	868,723	120,891
Dambovitza	5,758,214	801,310
Maramures	201	28
Prahova	16,297,596	2,267,965
	23,314,366	3,244,415
Russia:[1]		
Baku—		
Balakhani	5,138,397	758,883
Bibi-Eibat	10,761,708	1,485,603
Binagadi	2,860,694	416,950
Ramani	7,090,409	960,760
Sabunchi	6,758,028	970,981
Surakhani	10,565,704	1,324,189
Undistributed	510,999	72,979
	43,685,939	5,990,345
Cheleken Island	76,209	10,819
Emba-Ural	1,521,958	225,275
Ferghana	132,805	18,123
Grozny	18,372,484	2,577,509
Kuban-Black Sea	521,421	77,179
	64,310,816	8,899,250
Venezuela:		
Ambrosio	1,736,534	238,200
Benitez	134,142	19,600
Concepción	674,865	94,700
El Mene	2,314,491	311,760
Guanoco	292,100	42,760
Lagunillas	1,176,859	172,290
La Paz	931,313	136,990
La Rosa	21,243,175	3,120,600
Mene Grande	8,722,540	1,317,100
	37,226,019	5,454,000

[1] Exclusive of Sakhalin.

IMPORTS AND EXPORTS

The statistics of imports and exports and of shipments to Territories, given in this report, unless otherwise specified, have been compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce. Data for refined products of petroleum are given with refinery statistics on page 414.

Imports of crude petroleum into the United States in 1926 amounted to approximately 60,400,000 barrels, valued at a little over $79,000,000, representing a slight decrease in quantity but an increase in value over 1925. Exports of domestic crude oil in 1926 totaled approximately 15,400,000 barrels, a moderate increase over the preceding year. The major part of the exports was consigned to Canada. Shipments to Territories were of slight importance.

The most important event of the year with respect to foreign sources of supply was the production decline in the Mexican fields, which was reflected in a decrease of imports from that country of nearly 15,000,000 barrels. Colombia, which had been a fairly large producer for some time, became a shipper of crude petroleum in July, 1926, when a pipe line to the coast was put in operation. Exports from Colombia to the United States in 1926 totaled approximately 3,600,000 barrels, with an average value per barrel of $2. A total of 12,285,000 barrels of crude petroleum was imported into the United States from Venezuela in 1926, an increase over 1925 of 162 per cent. This gain was the largest single factor in compensating for the decline in imports from Mexico. Exports of Venezuelan oil to the United States in 1926 were equivalent to about one-third of the production, the remainder being either shipped to other countries, refined in the vicinity of Lake Maracaibo, or added to storage.

Crude petroleum imported, exported, and shipped to Territories, 1922–1926

[Barrels of 42 U. S. gallons]

Year	Imports		Exports (including foreign crude oil)		Shipments from United States to Territories						Total of exports and shipments to Territories
					Alaska		Hawaii		Porto Rico		
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value	Barrels
1922	127,308,423	$70,383,309	10,162,817	$18,422,231	------	------	641,721	$1,060,445	233	$1,343	10,804,771
1923	82,015,025	53,882,259	17,385,378	23,262,190	2,741	$13,713	146,482	161,198	------	------	17,534,601
1924	77,775,173	73,841,507	17,972,539	26,660,412	204	1,008	265,600	275,600	179	1,060	18,238,522
1925	61,824,242	75,406,956	13,335,107	24,369,277	124	232	1,429	7,200	------	------	13,336,660
1926	60,382,329	79,307,877	15,407,398	28,500,209	496	2,743	------	------	------	------	15,407,894

Crude petroleum imported and exported, 1925–26, by months

[Thousands of barrels of 42 U. S. gallons]

	January	February	March	April	May	June	July	August	September	October	November	December	The year	
													Thousands of barrels	Value (thousands of dollars)
1925														
Imports:														
By countries—														
Mexico	6,461	4,951	5,992	4,755	6,083	4,898	3,780	3,638	3,522	4,079	3,599	3,291	55,049	64,645
Peru	211	406	81	210	------	139	------	139	------	------	371	268	1,825	4,159
Venezuela [1]	353	222	242	517	263	116	375	208	505	288	921	682	4,692	6,325
Other countries	------	------	60	------	138	------	------	60	------	------	------	------	258	278
	7,025	5,579	6,375	5,482	6,484	5,153	4,155	4,045	4,027	4,367	4,891	4,241	61,824	75,407
By ports of entry—														
Atlantic coast	4,217	3,585	3,723	3,251	3,368	2,909	2,548	2,175	2,001	2,802	3,328	3,333	37,240	46,671
Gulf coast	2,808	1,994	2,651	2,231	3,113	2,244	1,607	1,870	2,026	1,565	1,563	908	24,580	28,715
Northern border	------	------	1	------	3	------	------	------	------	------	------	------	4	21
	7,025	5,579	6,375	5,482	6,484	5,153	4,155	4,045	4,027	4,367	4,891	4,241	61,824	75,407

[1] Includes imports recorded by Bureau of Foreign and Domestic Commerce as from Dutch West Indies.

Crude petroleum imported and exported, 1925–26, by months—Continued

[Thousands of barrels of 42 U. S. gallons]

	January	February	March	April	May	June	July	August	September	October	November	December	The year: Thousands of barrels	The year: Value (thousands of dollars)
1925—Continued														
Exports:														
By countries—														
Domestic crude oil—														
Canada	653	546	766	626	642	810	884	1,111	586	1,026	508	758	8,916	16,429
Cuba	80	168	61	78	117	106	53	53	53	53	53	53	928	2,745
Germany	91	145	68			19	68		23		134		548	907
Italy	34		38					53			40		165	482
Japan	56	65		70	104	55	70	166	70	122		58	836	1,189
Mexico	160	126	105	1	353	190	129	13	24	15	2	1	1,119	1,338
United Kingdom	60				61					24			145	300
Other countries		62			53	57	66	50	135	38		7	468	885
Foreign crude oil	15	10	20	23	26	18	32	19	32	12	3		210	94
	1,149	1,122	1,058	798	1,356	1,255	1,302	1,465	923	1,290	740	877	13,335	24,369
By ports—														
Atlantic coast		5						103	1		40	6	155	433
Gulf coast	364	314	168	79	689	388	349	156	131	120	188	56	3,002	6,117
Mexican border	15	10	20	23	26	23	32	24	32	22	4		231	106
Northern border	531	472	651	534	537	584	640	822	526	642	468	589	6,996	13,634
Pacific coast	239	321	219	162	104	260	281	360	233	506	40	226	2,951	4,079
	1,149	1,122	1,058	798	1,356	1,255	1,302	1,465	923	1,290	740	877	13,335	24,369
Excess of imports over exports	5,876	4,457	5,317	4,684	5,128	3,898	2,853	2,580	3,104	3,077	4,151	3,364	48,489	51,038
1926														
Imports:														
By countries—														
Colombia							367	549	653	230	905	917	3,621	7,264
Mexico	3,496	2,883	5,362	4,405	3,344	4,215	3,399	3,360	2,265	2,500	2,916	2,253	40,398	46,778
Peru	370	120	440	390	304	278	306	235	267	119		215	3,044	7,029
Venezuela [1]	759	740	1,114	1,111	853	1,009	1,037	1,088	1,102	834	1,066	1,572	12,285	16,560
Other countries	63		300			69	76	100	63	177	156	30	1,034	1,677
	4,688	3,743	7,216	5,906	4,501	5,571	5,185	5,332	4,350	3,860	5,043	4,987	60,382	79,308
By ports of entry—														
Atlantic coast	3,412	1,962	4,966	3,521	2,821	3,630	3,705	3,266	3,585	2,155	3,112	3,470	39,605	54,749
Gulf coast	1,276	1,781	2,248	2,385	1,680	1,941	1,479	2,066	763	1,705	1,931	1,517	20,772	24,553
Northern border			2				1		2				5	6
	4,688	3,743	7,216	5,906	4,501	5,571	5,185	5,332	4,350	3,860	5,043	4,987	60,382	79,308
Exports:														
By countries—														
Domestic crude oil—														
Argentina		89			102	36							227	431
Canada	1,058	780	821	971	1,383	1,068	1,537	960	1,234	920	1,101	1,150	12,983	24,281
Cuba	53		54	115	53	53				53	53		434	1,177
Japan	70	108	71	177	200	66	185	60	151		175	72	1,335	1,536
Mexico	2	1	2	4	2	1	2	1	2	2	12	8	39	65
United Kingdom					62	2					1		65	98
Other countries		71	16	41	40		2	62	1	35	2	53	323	908
Foreign crude oil			1										1	4
	1,183	1,049	965	1,308	1,842	1,226	1,726	1,083	1,388	1,010	1,344	1,283	15,407	28,500
By ports—														
Atlantic coast		30		42	2				1	35			110	348
Gulf coast	107	125	70	114	255	80	31	62		200	55		1,099	2,509
Mexican border	2	1	2	4	1	1	1	1	2	2	12	7	36	65
Northern border	850	625	594	574	780	731	934	727	717	616	854	811	8,813	18,345
Pacific coast	224	268	299	574	804	414	760	293	668	157	423	465	5,349	7,233
	1,183	1,049	965	1,308	1,842	1,226	1,726	1,083	1,388	1,010	1,344	1,283	15,407	28,500
Excess of imports over exports	3,505	2,694	6,251	4,598	2,659	4,345	3,459	4,249	2,962	2,850	3,699	3,704	44,975	50,808

[1] Includes imports recorded by Bureau of Foreign and Domestic Commerce as from Dutch West Indies.

SHIPMENTS FROM CALIFORNIA THROUGH THE PANAMA CANAL

Shipments of California crude oil through the Panama Canal to eastern ports in the United States continued to decline in 1926, although at a reduced rate compared with the two previous years. In 1926 they totaled 12,666,000 barrels, as compared with 14,545,000 barrels in 1925. The comparative scarcity of light or refinable grades of crude in California in excess of refinery requirements in 1926 was again the chief cause of the decline in eastward domestic shipments. On the other hand, shipments of refined oils increased materially and for the first time outranked shipments of crude in quantity. An increase in the movement of refined oils from California eastward was recorded, despite a decline in shipments of gasoline, tops, and lubricating oil, and was due to an unusual increase in shipments of both gas oil and fuel oil. The bulk of the gas oil and most of the fuel oil were consigned to Atlantic ports, the gas oil for use as cracking stock and the fuel oil for general fuel purposes.

California oil shipped through Panama Canal to eastern ports in the United States, 1925–26, by months [1]

	January	February	March	April	May	June	July	August	September	October	November	December	The year
1925													
Crude oil:													
Thousands of long tons	189	224	211	262	185	152	133	178	136	70	93	187	2,020
Thousands of barrels (approx.)	1,363	1,614	1,522	1,883	1,331	1,092	958	1,283	981	503	666	1,349	14,545
Refined products (thousands of barrels) (approx.):													
Gasoline, naphtha, etc	297	283	1,145	817	557	1,367	1,496	1,118	553	689	998	960	10,280
Gas oil	-----	88	-----	186	-----	87	-----	-----	-----	68	76	323	828
Fuel oil	-----	-----	64	-----	-----	-----	-----	-----	-----	75	284	398	821
Lubricating oil	68	-----	65	-----	67	-----	123	68	-----	67	-----	68	526
Tops	178	265	189	70	-----	85	355	76	96	83	94	86	1,577
Total refined products	543	636	1,463	1,073	624	1,539	1,974	1,262	649	982	1,452	1,835	14,032
1926													
Crude oil:													
Thousands of long tons	116	211	151	218	164	195	120	146	120	136	69	115	1,761
Thousands of barrels (approx.)	833	1,516	1,087	1,568	1,179	1,407	862	1,048	861	981	494	830	12,666
Refined products (thousands of barrels) (approx.):													
Gasoline, naphtha, etc	897	333	750	452	832	692	643	812	917	523	869	755	8,475
Gas oil	230	304	338	478	696	355	394	614	385	545	372	597	5,308
Fuel oil	326	141	726	145	283	542	458	717	908	514	386	832	5,978
Lubricating oil	70	68	-----	68	-----	68	-----	-----	68	69	68	-----	479
Tops	162	-----	-----	166	-----	-----	-----	-----	119	-----	-----	-----	447
Total refined products	1,685	846	1,814	1,309	1,811	1,657	1,495	2,143	2,397	1,651	1,695	2,184	20,687

[1] From Panama Canal Record in long tons; converted to barrels by using the following factors for barrels per ton: Crude, 7.2; gasoline, 8.5; gas oil, 7.2; fuel oil, 6.6; lubricating oil, 6.8; tops, 8.2.

STOCKS

In this report stocks of crude petroleum are classified as follows:

1. Refinery stocks, or stocks held at refineries. These are reported separately for east of California only. Data concerning stocks held by other consumers are not available.

2. Pipe-line and tank-farm stocks, or petroleum that has been transported from the producing properties but has not been delivered at refineries or other points of consumption. For the States east of California such stocks are reported monthly as gross stocks, which include the total contents of tanks and pipe lines, and as net stocks, which are gross stocks minus sediment and water. The stocks reported for California were compiled by the San Francisco office of the Bureau of Mines and include all stocks of crude petroleum and fuel oil held on the Pacific coast, divided into two classes—light or refinable crude and heavy crude and fuel oil.

3. Producers' stocks, or petroleum held at the wells on the producing properties. Producers' stocks are reported annually and in the last five years have amounted to between 5,000,000 and 10,000,000 barrels yearly.

4. Stocks of foreign crude petroleum held by importers elsewhere than at refineries.

For the first time since 1920 stocks were materially reduced as a result of an increase in demand for refined products in excess of the increase in crude production. The grand total of all classes of crude stocks on December 31, 1926, amounted to 402,299,000 barrels, as compared with 431,646,000 barrels on hand the previous year. These figures indicate a withdrawal from stocks of approximately 30,000,000 barrels; it should be noted, however, that nearly 8,000,000 barrels of this amount was lost through fire in California. Pipe-line and tank-farm stocks in the Mid-Continent field were reduced the greatest amount, although the withdrawals from stocks of refinable crude in California comprised a much larger percentage of the total. Refinery stocks increased during the year, but producers' stocks declined to the lowest point since early in 1922.

Stocks of crude petroleum in the United States on December 31, 1922–1926

[Thousands of barrels of 42 U. S. gallons]

Year	Refinery stocks of crude petroleum	Pipe-line and tank-farm stocks of domestic crude petroleum, by fields of origin								Producers' stocks[2]	Foreign petroleum held by importers	Total
		Appalachian	Lima-Indiana	Illinois-southwest Indiana	Mid-Continent	Gulf coast	Rocky Mountain	California[1]	Total			
1922	33,805	8,868	685	10,140	152,573	24,781	1,991	49,375	248,413	8,428	984	291,630
1923	33,259	9,210	975	11,091	202,904	23,974	19,704	62,162	330,020	5,850	1,383	374,512
1924	[2] 40,995 [2] 31,184	9,286	1,221	10,870	210,558	20,200	28,672	[3] 68,867 [3] 96,505	[3] 349,674 [3] 377,312	8,389	734	[3] 399,792 [3] 417,619
1925	[2] [4] 27,157 [2] [4] 29,200	8,493	971	10,582	195,941	19,263	28,995	[5] 129,434 [5] 130,234	[5] 393,679 [5] 394,479	7,560	407	[4] [5] 428,803 [4] [5] 431,646
1926	[2] 35,475	7,790	666	11,770	173,848	20,031	28,075	118,131	360,311	5,904	609	402,299

[1] Includes producers' stocks.
[2] Exclusive of California.
[3] California stocks reported on new basis to include total stocks of crude petroleum and fuel oil.
[4] Includes 2,043,000 barrels in coastwise transit—for comparison with 1926 figures.
[5] Includes 800,000 barrels working stocks not previously recorded.

Stocks of crude petroleum held in the United States at end of each month, 1925–26

[Thousands of barrels of 42 U. S. gallons]

		January	February	March	April	May	June	July	August	September	October	November	December
1925													
East of California:													
At refineries, by location of storage—													
East coast—													
Domestic		8,523	7,734	8,081	8,504	8,200	8,784	8,601	7,122	7,643	6,079	5,134	{ 4,801 [1] 6,844
Foreign		2,020	2,446	2,665	1,900	1,859	2,100	2,209	2,370	2,258	2,290	2,550	2,650
Appalachian		1,282	1,218	1,190	1,210	1,165	1,253	1,307	1,302	1,335	1,374	1,402	1,507
Indiana, Illinois, etc		1,855	1,800	1,479	1,574	1,549	1,558	1,438	1,148	924	1,091	1,116	1,318
Oklahoma, Kansas, etc		5,507	5,955	4,939	4,868	4,975	5,422	5,290	4,696	4,422	3,793	3,578	3,422
Texas—													
Inland		1,138	1,228	1,133	1,282	1,139	1,120	1,289	1,131	1,131	984	1,116	944
Gulf coast—													
Domestic		4,897	4,688	4,374	4,438	4,821	5,529	5,496	5,153	5,390	5,169	5,329	5,616
Foreign		543	655	519	556	726	651	663	530	580	610	491	341
Arkansas and inland Louisiana		292	343	413	403	598	678	604	574	716	715	926	656
Louisiana, Gulf coast—													
Domestic		3,755	4,128	4,812	4,660	4,273	3,983	4,533	3,834	3,725	3,384	2,784	3,242
Foreign		1,623	1,865	1,930	1,797	1,730	1,423	1,421	1,404	1,042	1,095	1,178	1,197
Rocky Mountain		931	886	1,078	1,262	1,380	1,381	1,456	1,451	1,494	1,449	1,540	1,463
Total at refineries		32,366	32,946	32,613	32,454	32,415	33,882	34,307	30,715	30,660	28,023	27,144	{ 27,157 [1] 29,200
Pipe-line and tank-farm stocks—													
Domestic petroleum, by fields of origin—													
Appalachian—													
New York, Pennsylvania, West Virginia, eastern and central Ohio	Gross	7,304	7,352	7,254	7,236	7,212	7,276	7,127	7,087	7,141	7,123	7,225	7,047
	Net	7,062	7,111	7,038	6,989	6,952	7,025	6,874	6,854	6,860	6,819	6,924	6,745
Kentucky	Gross	2,390	2,449	2,358	2,263	2,202	2,063	2,005	1,966	1,936	1,814	1,859	1,854
	Net	2,268	2,333	2,243	2,146	2,085	1,954	1,902	1,868	1,827	1,706	1,754	1,748
Lima-Indiana	Gross	1,397	1,407	1,364	1,367	1,422	1,353	1,313	1,285	1,302	1,260	1,237	1,173
	Net	1,183	1,190	1,151	1,154	1,209	1,150	1,114	1,097	1,100	1,058	1,035	971
Illinois-southwestern Indiana	Gross	11,377	11,341	11,424	11,470	11,551	11,479	11,379	11,448	11,090	11,047	11,048	11,056
	Net	10,845	10,813	10,936	10,982	11,060	10,986	10,886	10,954	10,620	10,574	10,577	10,582
Mid-Continent—													
Oklahoma, Kansas, north, central, and western Texas	Gross	186,832	185,551	184,664	183,481	182,327	177,722	174,529	172,982	171,738	171,304	169,901	165,244
	Net	175,193	174,275	173,088	171,845	170,860	166,203	163,104	161,629	159,315	159,470	158,368	153,012
North Louisiana and Arkansas	Gross	35,682	35,370	34,766	35,801	39,018	41,304	41,688	42,426	43,319	43,792	44,336	45,186
	Net	33,660	33,284	32,711	34,007	37,117	39,382	39,603	40,159	41,145	41,462	42,061	42,929
Gulf coast	Gross	19,426	19,309	19,909	20,086	20,727	20,895	21,406	21,112	20,716	20,396	20,151	19,624
	Net	19,076	18,948	19,517	19,676	20,325	20,477	20,951	20,657	20,310	19,981	19,771	19,263

Rocky Mountain	Gross	28,809	28,938	28,995	28,997	28,930	28,788	28,608	28,583	28,623	28,606	28,736	29,040
	Net	28,773	28,902	28,956	28,958	28,895	28,756	28,574	28,548	28,580	28,563	28,692	28,995
Total pipe-line and tank-farm	Gross	293,217	291,717	290,734	290,701	293,389	290,880	288,055	286,889	285,865	285,342	284,493	280,224
	Net	278,060	276,856	275,640	275,757	278,503	275,933	273,008	271,766	269,757	269,633	269,182	264,245
Foreign crude petroleum held in United States by importers—													
At Atlantic coast stations		187	204	256	231	204	120	173	197	143	47	79	104
At Gulf coast stations		406	320	220	492	825	759	743	613	596	480	499	303
Total		593	524	476	723	1,029	879	916	810	739	527	578	407
Producers' stocks [2]		8,319	8,256	8,186	8,117	8,047	7,978	7,908	7,838	7,769	7,699	7,630	7,560
Total crude stocks east of California		319,338	318,582	316,915	317,051	319,994	318,672	316,139	311,129	308,925	305,892	304,534	299,369 / [1] 301,412
California:													
Light		41,914	42,450	43,422	44,040	44,600	44,058	43,411	[3] 41,566	43,007	44,059	44,561	44,451
Heavy (including fuel oil)		58,112	59,279	60,299	62,565	65,481	68,337	72,388	78,507	81,476	83,391	84,373	84,983 / [4] 85,783
1926													
East of California:													
At refineries, by location of storage—													
East coast—													
Domestic		8,003	6,397	6,602	6,664	7,267	8,544	8,582	8,754	9,145	9,465	7,913	7,240
Foreign		2,754	2,473	3,113	3,242	2,919	2,681	3,092	3,078	2,648	2,220	2,354	2,186
Appalachian		1,546	1,579	1,616	1,624	1,653	1,688	1,722	1,659	1,688	1,675	1,664	1,673
Indiana, Illinois, etc		1,492	1,482	1,571	1,727	1,749	1,919	1,881	1,844	1,992	2,034	2,058	2,224
Oklahoma, Kansas, etc		3,594	3,607	3,558	4,072	3,825	3,713	3,081	2,889	2,312	2,287	2,548	2,926
Texas—													
Inland		1,155	1,114	740	1,025	1,227	1,147	1,133	1,010	942	863	952	952
Gulf coast—													
Domestic		5,533	6,176	5,975	6,642	6,501	6,736	6,627	7,029	7,571	7,536	7,903	8,194
Foreign		286	144	266	369	244	407	416	371	306	281	206	236
Arkansas and inland Louisiana		470	546	690	631	762	649	572	715	676	710	638	601
Louisiana, Gulf coast—													
Domestic		2,883	3,953	4,217	5,102	6,291	6,256	6,664	7,060	8,241	7,519	7,067	7,019
Foreign		1,556	1,531	1,871	1,732	1,807	1,464	1,089	1,111	909	766	761	802
Rocky Mountain		1,509	1,521	1,498	1,571	1,562	1,538	1,500	1,462	1,394	1,487	1,501	1,422
Total at refineries		30,781	30,523	31,717	34,401	35,807	36,742	36,359	36,982	37,824	36,843	35,565	35,475

[1] Includes 2,043,000 barrels in coastwise transit—for comparison with 1926 figures.
[2] Figures for December based on reports from companies; other months prorated.
[3] 1,180,000 barrels refinable crude transferred to heavy crude stocks in August.
[4] Includes 800,000 barrels working stocks not previously recorded.

Stocks of crude petroleum held in the United States at end of each month, 1925–26—Continued

[Thousands of barrels of 42 U. S. gallons]

		January	February	March	April	May	June	July	August	September	October	November	December
1926—Continued													
East of California—Continued.													
Pipe-line and tank-farm stocks—													
Domestic petroleum, by fields of origin—													
Appalachian—													
New York, Pennsylvania, West Virginia, eastern and central Ohio	Gross	7,011	7,053	6,956	7,192	7,119	7,224	7,269	7,235	7,135	6,962	6,864	6,855
	Net	6,712	6,753	6,657	6,893	6,823	6,930	6,984	6,962	6,841	6,680	6,577	6,570
Kentucky	Gross	1,926	1,897	1,901	1,887	1,890	1,845	1,773	1,583	1,391	1,291	1,221	1,350
	Net	1,820	1,790	1,794	1,778	1,779	1,740	1,668	1,481	1,272	1,165	1,090	1,220
Lima-Indiana	Gross	1,139	1,107	1,084	1,091	1,053	998	973	931	945	913	900	877
	Net	937	905	882	889	851	796	771	731	733	702	689	666
Illinois-southwestern Indiana	Gross	11,083	11,480	11,947	12,250	12,518	12,334	12,212	11,930	11,934	12,068	12,216	12,255
	Net	10,606	11,001	11,468	11,771	12,039	11,854	11,731	11,451	11,448	11,631	11,731	11,770
Mid-Continent—													
Oklahoma, Kansas, north, central, and western Texas	Gross	161,406	159,480	157,381	154,077	150,557	148,103	148,116	147,414	148,513	149,451	153,475	154,558
	Net	149,258	147,175	144,932	141,381	137,932	135,279	135,445	135,089	136,197	137,350	140,925	142,208
North Louisiana and Arkansas	Gross	45,782	45,550	45,381	44,691	43,931	42,568	41,239	39,429	37,636	36,145	34,743	34,318
	Net	43,449	43,227	43,157	42,514	41,711	40,305	38,815	37,100	35,000	33,839	32,376	31,040
Gulf coast	Gross	18,805	17,905	17,635	16,600	16,710	17,968	16,395	17,688	18,664	19,806	19,339	20,430
	Net	18,441	17,506	17,261	16,259	16,333	16,568	16,003	17,300	18,255	19,418	18,965	20,031
Rocky Mountain	Gross	29,200	29,546	29,954	30,201	30,589	30,593	30,577	30,384	29,933	29,260	28,620	28,129
	Net	29,185	29,505	29,909	30,156	30,542	30,548	30,527	30,335	29,882	29,211	28,571	28,075
Total pipe-line and tank-farm	Gross	276,352	274,018	272,239	267,989	264,367	261,633	258,554	256,594	256,151	255,896	257,378	258,772
	Net	260,408	257,862	256,060	251,641	248,010	244,020	241,944	240,449	239,628	239,996	240,924	242,180
Foreign crude petroleum held in United States by importers—													
At Atlantic coast stations		97	124	102	56	42	58	70	75	65	72	105	165
At Gulf coast stations		342	407	312	312	327	247	299	453	471	536	555	444
Total		439	531	414	368	369	305	369	528	536	608	660	609
Producers' stocks [2]		7,419	7,292	7,151	7,015	6,874	6,738	6,597	6,456	6,320	6,180	6,044	5,904
Total crude stocks east of California		299,047	296,208	295,342	293,425	291,060	287,805	285,269	284,415	284,308	283,627	283,193	284,108
California:													
Light		44,197	44,871	43,973	[3] 38,634	37,192	35,454	33,548	32,149	30,494	30,390	30,051	30,861
Heavy (including fuel oil)		86,614	86,744	88,466	[3] 85,656	88,184	87,364	88,092	87,772	87,353	87,529	87,440	87,270

[2] Figures for December based on reports from companies; other months prorated. [3] Loss by fire, 4,600,000 barrels light crude and 3,204,000 barrels heavy crude, total, 7,804,000 barrels.

CONSUMPTION

The consumption of crude petroleum in the United States in 1926, measured by refinery runs to stills, established a new high figure of 779,264,000 barrels, an increase of 39,344,000 barrels, or 5 per cent, over 1925. Of the total, 44,963,000 barrels, or 6 per cent, was foreign crude petroleum. An increase of only 5 per cent in refinery throughput in the face of an increase of 15.5 per cent in the production of gasoline, the principal refined product, is accounted for by the fact that the percentage yield of gasoline was higher than ever before. This, in turn, was due to more efficient operation and to an increase in cracking operations.

The domestic consumption of all oils, obtained by a calculation which gives a figure for the combined consumption of crude petroleum and the various refined products, amounted to 779,881,000 barrels, a gain of 7 per cent over 1925. In addition, 131,494,000 barrels of crude petroleum and refined products was exported or shipped to noncontiguous Territories, which, added to the indicated domestic demand, gives a total demand of 911,375,000, a gain of 8.5 per cent over 1925.

Crude petroleum run to stills at refineries in the United States, 1925–26, by districts and months

[Thousands of barrels of 42 U. S. gallons]

	January	February	March	April	May	June	July	August	September	October	November	December	The year
1925													
East coast:													
Domestic	8,696	8,024	8,877	9,162	9,161	9,283	10,495	9,069	8,255	8,374	7,644	7,685	104,725
Foreign	1,743	1,853	2,362	2,579	2,386	1,963	1,303	1,505	1,706	2,231	2,256	1,879	23,766
Appalachian	1,993	1,813	2,14	2,043	2,204	2,158	2,122	2,243	2,130	2,160	2,045	2,067	25,118
Indiana, Illinois, etc	5,585	5,280	5,464	5,268	5,803	5,811	6,013	6,051	5,667	5,477	5,311	5,429	67,159
Oklahoma, Kansas, etc	7,533	7,285	7,769	7,708	8,446	8,892	9,352	9,144	8,423	7,960	7,341	7,759	97,612
Texas:													
Inland	3,110	2,924	3,146	3,030	3,317	3,155	3,028	3,034	2,779	2,709	2,735	2,990	35,957
Gulf coast—													
Domestic	8,637	7,642	8,051	7,859	7,990	8,530	8,504	8,836	8,369	9,004	8,188	9,138	100,748
Foreign	634	699	725	907	659	[illegible]	651	581	340	438	729	552	7,577
Arkansas and inland Louisiana	1,081	1,034	1,296	1,491	1,374	1,481	1,563	1,333	1,269	1,408	1,449	1,460	16,239
Louisiana, Gulf coast:													
Domestic	2,580	2,442	2,890	2,841	3,258	3,461	4,017	4,304	3,502	3,942	3,759	3,767	40,763
Foreign	832	666	1,051	1,150	1,168	1,361	639	657	847	599	550	475	9,995
Rocky Mountain	1,812	1,701	1,700	1,989	2,195	2,268	2,482	2,512	2,397	2,527	2,365	2,216	26,164
California	13,244	11,758	14,081	13,283	14,418	15,888	17,406	17,747	16,431	17,141	15,938	16,762	184,097
	57,480	53,121	59,552	59,310	62,379	64,913	67,575	67,016	62,115	63,970	60,310	62,179	739,920
1926													
East coast:													
Domestic	7,361	6,963	7,830	7,666	8,081	8,302	9,332	8,565	8,035	9,437	10,300	9,535	101,347
Foreign	1,948	1,860	2,664	2,287	2,386	2,113	2,249	2,663	2,896	2,656	2,572	3,002	29,296
Appalachian	2,135	2,146	2,300	2,263	2,383	2,391	2,470	2,554	2,457	2,550	2,432	2,421	28,502
Indiana, Illinois, etc	5,518	5,183	5,556	5,613	6,194	5,956	6,032	6,016	5,861	5,957	5,911	5,910	69,707
Oklahoma, Kansas, etc	7,741	6,924	7,310	7,536	8,692	8,333	8,505	8,621	8,530	8,123	8,034	8,157	96,506
Texas:													
Inland	2,752	2,609	2,890	2,884	3,026	3,041	3,153	3,191	3,082	3,257	3,040	3,258	36,183
Gulf coast—													
Domestic	9,030	8,133	9,030	9,212	9,158	9,709	9,851	9,947	9,673	10,942	10,235	11,323	116,243
Foreign	441	459	513	460	219	266	305	248	217	171	238	147	3,684
Arkansas and inland Louisiana	1,434	1,413	1,542	1,626	1,610	1,426	1,626	1,689	1,756	1,742	1,829	1,814	19,507
Louisiana, Gulf coast:													
Domestic	4,066	3,047	3,574	3,244	3,078	3,292	3,119	2,989	2,974	3,501	3,139	3,499	39,522
Foreign	311	904	933	1,041	1,159	1,235	1,216	1,247	1,123	859	967	988	11,983
Rocky Mountain	2,170	2,123	2,341	2,304	2,434	2,490	2,542	2,532	2,506	2,654	2,546	2,563	29,205
California	16,196	14,583	16,260	15,395	16,934	16,256	16,935	17,387	17,310	17,058	16,398	16,867	197,579
	64,103	56,347	62,743	61,531	65,354	64,810	67,335	67,589	66,420	68,907	67,641	69,484	779,264

Indicated deliveries of crude petroleum (exclusive of California grades) to domestic consumers, 1925–26, by months [1]

[Thousands of barrels of 42 U. S. gallons

	January	February	March	April	May	June	July	August	September	October	November	December	The year
1925													
Domestic petroleum, by fields of origin:													
Appalachian	2,154	1,985	2,505	2,496	2,392	2,436	2,619	2,386	2,380	2,541	2,039	2,464	28,397
Lima-Indiana	204	159	222	187	127	257	230	200	176	216	175	221	2,374
Illinois and southwestern Indiana	744	689	656	599	638	798	850	631	1,056	778	686	686	8,811
Mid-Continent	35,305	31,622	35,258	34,893	38,350	41,216	40,661	38,144	37,212	34,832	34,430	37,819	439,742
Gulf coast	3,265	2,104	2,222	2,709	2,602	2,775	2,634	3,185	3,222	3,228	2,884	3,174	34,004
Rocky Mountain	2,540	2,378	2,868	2,893	2,948	2,945	3,244	3,222	3,185	3,283	3,040	2,756	35,302
Other [2]	1	1	1	1	1	1	1	1	1	1	1	1	12
Deliveries and exports	44,213	38,938	43,732	43,778	47,058	50,428	50,239	47,769	47,232	44,879	43,255	47,121	548,642
Exports	895	792	819	613	1,226	972	988	1,081	659	761	696	651	10,153
Deliveries	43,318	38,146	42,913	43,165	45,832	49,456	49,251	46,688	46,573	44,118	42,559	46,470	538,489
Foreign petroleum	7,151	5,638	6,403	5,212	6,152	5,285	4,086	4,132	4,066	4,567	4,837	4,412	61,941
	50,469	43,784	49,316	48,377	51,984	54,741	53,337	50,820	50,639	48,685	47,396	50,882	600,430
1926													
Domestic petroleum, by fields of origin:													
Appalachian	2,129	2,121	2,484	2,160	2,433	2,388	2,515	2,675	2,785	2,759	2,564	2,330	29,343
Lima-Indiana	192	191	203	164	214	250	208	214	167	197	159	179	2,338
Michigan	2	1	2	3	3	3	4	7	8	15	20	26	94
Illinois and southwestern Indiana	666	261	313	331	440	904	859	1,005	715	522	573	652	7,241
Mid-Continent	35,293	31,487	34,914	37,429	39,044	38,448	37,318	38,824	37,344	39,507	37,569	40,536	447,713
Gulf coast	3,652	3,627	3,001	3,757	2,740	2,395	4,208	3,574	3,954	3,731	5,539	4,306	44,484
Rocky Mountain [3]	2,978	2,702	3,080	3,026	3,004	3,251	3,483	3,441	3,548	3,685	3,426	3,085	38,709
Deliveries and exports	44,912	40,390	43,997	46,870	47,878	47,639	48,595	49,740	48,521	50,416	49,850	51,114	569,922
Exports	957	780	664	730	1,037	811	965	789	718	851	909	811	10,022
Deliveries	43,955	39,610	43,333	46,140	46,841	46,828	47,630	48,951	47,803	49,565	48,941	50,303	559,900
Foreign petroleum	4,656	3,651	7,332	5,952	4,500	5,635	5,121	5,173	4,342	3,788	4,991	5,038	60,179
	48,611	43,261	50,665	52,092	51,341	52,463	52,751	54,124	52,145	53,353	53,932	55,341	620,079

[1] Indicated deliveries equal production plus imports plus stocks, exclusive of refinery stocks, at beginning of period minus exports and stocks at end of period.
[2] Alaska and Michigan.
[3] Includes Alaska.

Crude petroleum and fuel oil consumed for fuel, 1920–1926

[Thousands of barrels of 42 U. S. gallons]

	1920	1921	1922	1923	1924	1925	1926
Crude oil:							
On producing oil properties	4,647	4,261	5,747	4,316	4,284	4,286	3,079
In operation of pipe lines east of California	(1)	1,668	1,767	1,715	1,852	1,825	1,993
Fuel oil (including some crude and gas oil):							
By refineries	(1)	(1)	(1)	(1)	(1)	50,455	46,416
By locomotives (all services, class 1 carriers) [2]	45,945	39,558	43,527	55,580	58,950	58,520	58,330
By vessels cleared for foreign countries (bunker oil) [3]	26,335	27,076	31,692	37,582	43,328	42,827	46,662
By U. S. Navy (fiscal year) [4]	5,845	7,530	6,372	5,837	7,044	7,100	7,404
By U. S. Shipping Board—							
Domestic oil	2,000	3,361	17,515	19,049	18,579	12,570	12,983
Mexican oil	14,742	11,936					
Open-market purchase	4,185	3,824	714				
	20,927	19,121	18,229	19,049	18,579	12,570	12,983
By gas manufacturers	21,982	[5] 21,380	20,381	[6] 22,156	[5] 23,498	[5] 22,556	[7] 22,000
By electric public-utility power plants [8]	13,123	12,045	13,197	14,679	16,630	10,246	9,399

[1] Data not available.
[2] Interstate Commerce Commission.
[3] Bureau of Foreign and Domestic Commerce.
[4] Navy Department.
[5] American Gas Association.
[6] Bureau of the Census.
[7] Estimated.
[8] U. S. Geological Survey.

PRICES

In 1926, as in 1925 and 1924, prices in general were higher than for the preceding year. The total production in 1926 was valued at the wells at $1,447,760,000, or an average per barrel of $1.88, representing an increase of 20 cents over the previous year. With the exception of certain districts in the Appalachian and Gulf coast fields and the State of Montana, all the producing districts and States reported a higher value per barrel. The decrease in Montana was undoubtedly due to surplus production in the middle of the year which for a time greatly taxed storage facilities.

Posted prices, in general, advanced as usual in the early spring, were highest in May, but from then on fell off. This advance and decline in prices may be explained by the fact that until the Seminole field was actively exploited during the last half of the year it appeared that the 1926 output would fall considerably below that of 1925. The price increases of the first half of the year were due to this apparent shortage and to the general lowering of stocks that followed.

Posted prices of most of the grades of crude from the Appalachian fields advanced as usual in February but were soon reduced to their previous levels. The price structure of these grades continued weak throughout the remainder of the year, so that on December 31 the price was considerably below that of January 1. Prices for grades from the Central States showed greater strength than the Appalachian crudes, but these, too, declined the latter part of the year from the high point established in May. Mid-Continent grades likewise were at their highest in May but with the rapid development of the Seminole field showed weakness during the closing months of the year. Smackover was a notable exception; the price in this field stood much higher at the close of the year than at the beginning, due to a decline in production, which became insufficient to supply the demand for refining purposes. The price movement in the central and west Texas fields was similar to that of the Mid-Continent district. Gulf coast crudes were put on the gravity basis in March, making it difficult to trace the price trend. The record, however, is complete enough to disclose a stronger tendency of prices in May followed by decreases which brought prices considerably below those of January 1.

Prices in the Rocky Mountain fields, with the exception of the Sunburst field, were also at their highest in May and at the close of the year were higher than at the beginning. Crude prices in California showed less fluctuation than in any other section of the country. Only one change in price was reported by the chief purchasing company whose prices were selected as representative. This occurred on March 11 and was a general increase for the lighter grades from a few cents to as high as 44 cents for the highest grades of Rosecrans and Dominguez crude. The heavy grades, of which there was an oversupply, were unchanged.

Average price per barrel paid for crude petroleum at the wells, 1923–1926, by States

[Based on actual purchases, including premiums]

State	1923	1924	1925	1926	State	1923	1924	1925	1926
Alaska	(1)	(1)	$4.25	(1)	New York	$3.31	$3.64	$3.70	$3.68
Arkansas	$0.69	$0.94	.89	$1.11	Ohio:				
California [2]	.92	1.20	1.42	1.54	Central and eastern	2.57	2.74	2.67	2.74
Colorado	1.19	1.10	1.48	1.84	Northwestern	2.02	2.00	2.17	2.34
Illinois	1.87	1.76	1.94	2.22	Total Ohio	2.41	2.52	2.53	2.64
Indiana:					Oklahoma	1.74	1.57	1.97	2.31
Southwestern	1.82	1.80	1.92	2.22	Pennsylvania	3.33	3.61	3.62	3.56
Northeastern	1.84	1.93	2.06	2.07	Tennessee	1.75	1.80	2.21	2.33
Total Indiana	1.82	1.84	1.95	2.19	Texas:				
Kansas	1.63	1.54	1.94	2.26	Gulf coast	1.39	1.56	1.62	1.50
Kentucky	1.97	1.97	2.32	2.43	Rest of State	1.50	1.51	1.86	1.96
Louisiana:					Total Texas	1.48	1.52	1.81	1.85
Gulf coast	1.36	1.63	1.57	1.39	Utah	------	(1)	1.00	(1)
Northern	1.48	1.41	1.61	1.70	West Virginia	3.27	3.52	3.48	3.46
Total Louisiana	1.47	1.44	1.60	1.65	Wyoming	1.09	1.23	1.76	1.98
Michigan	------	------	2.50	2.69	Other	[3] 2.28	[4] 3.38	------	[4] 1.25
Montana	1.47	1.33	1.57	1.32					
New Mexico	(1)	1.30	1.71	1.96	United States	1.34	1.43	1.68	1.88

[1] Included under "Other."
[2] California State Mining Bureau.
[3] Alaska, Missouri, and New Mexico.
[4] Alaska and Utah.

Average monthly prices per barrel for selected grades of crude petroleum at wells, 1925–26

	Pennsylvania	Oklahoma-Kansas (34-34.9°)	Gulf Coast Grade A	Illinois	Lima, Ohio	Panhandle	California
1925							
January	$3.08	$1.19	$1.52	$1.45	$1.66	----------	$1.25
February	3.63	1.70	1.90	2.01	2.22	----------	1.60
March	3.69	1.80	2.00	2.09	2.30	----------	1.64
April	3.43	1.80	1.85	2.02	2.23	----------	1.64
May	3.40	1.80	1.75	2.02	2.23	----------	1.64
June	3.76	1.80	1.75	2.02	2.23	----------	1.64
July	3.80	1.86	1.75	2.09	2.30	----------	1.64
August	3.49	1.74	1.52	2.09	2.26	----------	1.64
September	3.05	1.63	1.50	1.87	1.98	----------	1.59
October	3.05	1.63	1.50	1.87	1.98	$1.25	1.46
November	3.12	1.63	1.50	1.87	1.98	1.25	1.46
December	3.46	1.63	1.50	1.87	1.98	1.35	1.46
	3.41	1.69	1.67	1.94	2.11	----------	1.55
1926							
January	3.55	1.63	1.50	1.87	1.98	1.35	1.46
February	3.69	1.88	1.50	2.11	2.22	1.50	1.46
March	3.61	1.88	1.50	2.12	2.23	1.50	1.62
April	3.55	1.88	1.50	2.12	2.23	1.54	1.70
May	3.55	2.02	1.55	2.24	2.35	1.60	1.70
June	3.55	2.13	1.60	2.37	2.48	1.65	1.70
July	3.36	2.13	1.60	2.37	2.48	1.65	1.70
August	3.30	2.13	1.59	2.37	2.48	1.65	1.70
September	3.30	2.13	1.40	2.37	2.48	1.65	1.70
October	3.30	2.13	1.40	2.37	2.48	1.29	1.70
November	3.19	1.98	1.40	2.24	2.35	1.25	1.70
December	3.05	1.80	1.40	2.10	2.21	1.25	1.70
	3.41	1.98	1.50	2.22	2.33	1.49	1.65

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change

Date	Appalachian field [1]																Lima-Indiana field [2]		Illinois and southwestern Indiana field [2]		
	Pennsylvania grade in lines of New York Transit Co. and Bradford grade in lines of National Transit Co.	Pennsylvania grade			Gaines grade in lines of National Transit Co.[3]	Keister	Cabell grade in lines of Eureka Pipe Line Co.	Corning grade in lines of Buckeye Pipe Line Co.	Wooster [2]	Ragland	Somerset oil in lines of Cumberland Pipe Line Co.		Western Kentucky [4]				Lima, Ohio	Indiana	Illinois and Princeton, Ind.	Plymouth	Waterloo
		In lines of Southwest Pennsylvania Pipe Line Co. and National Transit Co.	In lines of Eureka Pipe Line Co.	In lines of Buckeye Pipe Line Co.							Medium	Light	32.9° and below	33–35.9°	36° and above						
Jan. 1	$3.65	$3.55	$3.50	$3.30	$2.95	------	$2.10	$1.95	$2.00	$1.15	$2.20	$2.35	$1.60	$1.70	$1.80		$1.98	$1.78	$1.87	$1.40	$1.00
Feb. 2	------	------	------	------	------	------	------	------	2.25	------	------	------	------	------	------		2.23	2.00	2.12	1.65	1.10
Feb. 3	------	------	------	------	------	------	------	2.25	------	------	------	------	1.85	1.95	2.05		------	------	------	------	------
Feb. 13	3.90	3.80	3.75	3.65	------	------	2.20	------	------	------	2.30	2.45	------	------	------		------	------	------	------	------
Feb. 15	------	------	------	------	------	$2.45	------	------	------	------	------	------	------	------	------		------	------	------	------	------
Feb. 27	------	------	------	------	------	------	------	2.35	------	------	------	------	------	------	------		------	------	------	------	------
Mar. 1	------	------	------	------	------	------	------	------	2.35	------	------	------	------	------	------		------	------	------	------	------
Mar. 8	3.65	3.55	3.50	3.30	------	------	------	------	------	------	------	------	------	------	------		------	------	------	------	------
															36–38.9°	39° and above					
Mar. 19	------	------	------	------	------	------	------	------	------	------	------	------	------	------	$2.05	$2.15	------	------	------	------	------
Apr. 27	------	------	------	------	3.10	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
May 17	------	------	------	------	------	------	2.40	------	2.55	------	2.50	2.65	------	------	------	------	2.48	2.25	2.37	1.90	1.35
May 18	------	------	------	------	------	------	------	------	------	------	------	------	2.10	2.20	2.30	2.40	------	------	------	------	------
May 19	------	------	------	------	------	------	------	2.45	------	1.25	------	------	------	------	------	------	------	------	------	------	------

May 22								2.55													
July 8	3.40	3.30	3.25	3.05	2.85	2.30															
Sept. 9														$2.10							
Oct. 8						2.05															
Nov. 17									2.25					1.83		2.21	1.98	2.10	1.63		
Nov. 18	3.15	3.05	3.00	2.80		1.80	2.10	[2.25 / [3] 2.15]		.95	2.20	2.35									
Average for year	3.51	3.41	3.36	3.17		2.27	2.28	2.39	2.40	1.18	2.38	2.53				2.33	2.11	2.22	1.75	1.25	

[1] The Joseph Seep Purchasing Agency.
[2] The Ohio Oil Co.
[3] Discontinued July 24.
[4] Indian Refining Co.; the Ohio Oil Co. after Oct. 15.
[5] Run prior to Sept. 15.

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Date	Mid-Continent field																											Corsicana [2]
	Kansas-Oklahoma; north and central Texas [1]																											
	Below 28° [3]	28–28.9°	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°	37–37.9°	38–38.9°	39–39.9°	40–40.9°	41–41.9°	42–42.9°	43–43.9°	44° and above										Heavy
Jan. 1	$1.07	$1.15	$1.23	$1.31	$1.39	$1.47	$1.55	$1.63	$1.71	$1.79	$1.87	$1.95	$2.03	$2.11	$2.19	$2.27	$2.35	$2.43										$1.05
																		44–44.9°	45–45.9°	46–46.9°	47–47.9°	48–48.9°	49–49.9°	50–50.9°	51–51.9°	52° and above		
Feb. 1	1.20	1.40	1.48	1.56	1.64	1.72	1.80	1.88	1.96	2.04	2.12	2.20	2.28	2.36	2.44	2.52	2.60	$2.68	$2.76	$2.84	$2.92	$3.00	$3.08	$3.16	$3.24	$3.32		1.15
May 15	1.30	1.65	1.73	1.81	1.89	1.97	2.05	2.13	2.21	2.29	2.37	2.45	2.53	2.61	2.69	2.77	2.85	2.93	3.01	3.09	3.17	3.25	3.33	3.41	3.49	3.57		1.25
Nov. 17 [4]	-----	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	-----	-----
Average for year [1]	-----	1.52	1.59	1.67	1.75	1.82	1.90	1.98	2.05	2.13	2.20	2.28	2.36	2.43	2.51	2.59	2.66	2.74	2.81	2.88	2.95	3.02	3.09	3.16	3.23	3.30		1.20

[1] Prairie Oil & Gas Co. and Gulf Pipe Line Co.
[2] Magnolia Petroleum Co.
[3] This gravity posted by Humble Oil & Refining Co. and Magnolia Petroleum Co. Aug. 30; for gravities lower than 28° Humble Oil & Refining Co. posted a scale of 8 cents per barrel decrease for each lower degree of gravity.
[4] These prices were posted Nov. 1 by Humble Oil & Refining Co., Nov. 5 by Magnolia Petroleum Co., and Nov. 7 by The Texas Co.

| Date | Mid-Continent field—Continued | | |

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Date	Mid-Continent field—Continued										
	North Louisiana and Arkansas—Continued										
	Bellevue [1] extra heavy below 32°	Cotton Valley [1]	Urania [2]	Calion below 24° [3]	Smackover [1]					Stephens [4]	
					Below 24°	24–24.9°	25–25.9°	26–26.9°	27° and above	Below 26°	26° and above
Jan. 1	$1.65	$1.10		$0.85	$0.85	$1.15	$1.20	$1.25	$1.30	$1.20	$1.40
Jan. 26			$1.50								
Feb. 1				.95							
Feb. 2				1.00	.95	1.25	1.30	1.35	1.40	1.30	1.50
Feb. 3					1.00						
Mar. 1			1.40								
Mar. 9	1.50										
Apr. 5			1.30								
May 18		1.20		1.10	1.10	1.35	1.40	1.45	1.50	1.45	1.65
May 26			1.15								
July 9			1.25								
Aug. 26			1.10								
Sept. 16	1.40										

Date	Stephens [4]			
	Below 28°	28–28.9°	29–29.9°	30–30.9°
Nov. 5	$1.30	$1.40	$1.45	$1.50
Average for year	1.50	1.16	1.23	1.05	1.05	1.30	1.35	1.40	1.45				

[1] Standard Oil Co. of Louisiana. Louisiana Oil and Refining Corporation. [3] Gulf Refining Co of Louisiana. [4] Atlantic Oil Producing Co.

Date	Mid-Continent field—Continued																			
	South central and eastern Texas																			
	Panola County [1]							Somerset [2]												
	32–34.9°			35–37.9°			38° and above	Below 30°		30–32.9°			33–35.9°			36–38.9°			39–41.9°	42° and above
Jan. 1								[3] $1.25		$1.35			$1.80			$1.95			$2.10	$2.35
Mar. 20	$1.70			$1.85			$2.00													
								28–28.9°	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°	37–37.9°	38–38.9°		
Apr. 1								$1.20	$1.30	$1.56	$1.64	$1.72	$1.80	$1.88	$1.96	$2.04	$2.12	$2.20		
May 15	1.95			2.10			2.25													
May 17								1.25	1.35	1.71	1.89	1.97	2.05	2.13	2.20	2.29	2.37	2.45		
Oct. 14									1.30	1.36	1.54	1.62	1.70	1.78	1.86	1.94	2.02	2.10		
Nov. 15										1.35	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80		
Dec. 1								1.35	1.45	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00		
	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°	37–37.9°														
Dec. 2	$1.70	$1.75	$1.80	$1.85	$1.90	$1.95	2.00													
Average for year	1.88	1.88	1.89	2.03	2.03	2.04	2.18	1.25	1.32	1.55	1.65	1.71	1.88	1.94	1.99	2.08	2.14	2.20		

[1] Magnolia Petroleum Co.

[2] Grayburg Pipe Line Co.

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Date	Mid-Continent field—Continued																							
	Panhandle [1]											West Texas [2]												
	28–30.9°			31–33.9°			34–36.9°			37–39.9°	40° and above	Below 26°	26–26.9°	27–27.9°	28–28.9°	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36° and above	Iatan [3]
Jan. 1	$1.05			$1.20			$1.35			$1.50	$1.55													$1.15
	Below 31°																							
Feb. 1	$1.15			1.30			1.50			1.65	1.70													
Apr. 9	1.20			1.35			1.55			1.70	1.75													
	28–28.9°	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°	37–37.9°	38–38.9°	39° and above													
May 17	$1.35	$1.40	$1.45	$1.50	$1.55	$1.60	$1.65	$1.70	$1.75	$1.80	$1.85	$1.90												
Aug. 1													$1.20	$1.25	$1.30	$1.35	$1.40	$1.45	$1.50	$1.55	$1.60	$1.65	$1.70	$1.75
Sept. 15													.80	.85	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35
Oct. 4	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25												
Nov. 23																								1.50
Average for year	1.25	1.27	1.29	1.36	1.38	1.40	1.49	1.51	1.53	1.60	1.62		.92	.97	1.02	1.07	1.12	1.17	1.22	1.27	1.32	1.37	1.42	1.47	1.19

[1] Kay County Gas Co., Gulf Pipe Line Co., first posting May 7, meeting schedule of Kay County Gas Co. until Sept. 24, when all grades were posted at $1.25; Humble Oil & Refining Co., first Panhandle posting June 21, with a scale of $1.35 for 28–28.9° and 5 cents per barrel increase for each higher degree of gravity to 44° and above; Sept. 22, all Carson and Hutchinson County crudes $1.25; Oct. 25, all grades Wheeler County $1.25, each grade Gray County reduced 25 cents; Nov. 1, each grade Gray County reduced 10 cents; Dec. 1, Wheeler County crude posted at $0.90 for 28–28.9°, with 5 cents per barrel increase for each higher degree to 44° and above.

[2] Crane and Upton Counties posted Aug. 1, by Kay County Gas Co.; same scale and prices were established Oct. 25 by Humble Oil & Refining Co. and included Crockett County also.

[3] Magnolia Petroleum Co. includes Howard and Westbrook Counties.

Date	Gulf coast field																				
	Coastal Texas [1]																			Coastal Louisiana [2]	
	Batson, Saratoga, Spindletop [3]	Cow Bayou, Goose Creek, Hull, Liberty, Sourlake					Big Creek, Blue Ridge, Pierce Junction, Moore [4]						Humble, Markham, West Columbia [5]						Boling [6]	High Island [7]	Edgerley, Vinton	Jennings
		Grade A	Grade B										Grade A	Grade B								
Jan. 1	$1.50	$1.50	$1.25				$1.25						$1.50	$1.25						$1.20	$1.50	$1.25
			Grade B																			
			Below 25°	25–25.9°	26–26.9°	27–27.9°	28–28.9°	29–29.9°	30° and above													
Mar. 12 [8]		1.50	$1.25	$1.30	$1.35	$1.40	$1.45	$1.50	$1.55													
Mar. 17																				1.25		
									30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35° and above								
Apr. 28 [9]			1.40	1.45	1.50	1.55	1.60	1.65	$1.70	$1.75	$1.80	$1.85	$1.90	$1.95								
Apr. 30																				1.40		
May 15 [10]	1.60	1.60	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05							1.60	1.35
														35–35.9°	36–36.9°	37–37.9°	38–38.9°	39–39.9°	40° and above			
June 8 [11]														$2.05	$2.10	$2.15	$2.20	$2.25	$2.30			
Aug. 6 [12]		1.25	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95			
Aug. 31 [13]	1.40	1.40	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	1.40		
Aug. 31 [14]			1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05			
Oct. 29																						1.15
Nov. 10 [15]		1.40	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20			
Average for year [16]	1.50	1.50	1.38	1.42	1.46	1.50	1.54	1.58	1.62	1.66	1.69	1.73	1.76	1.79	1.82	1.85	1.88	1.91	1.94	1.50	1.28	
Average for year [17]		1.44	1.44	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.66	1.68	1.70	1.72	1.74	1.76			

[1] Gulf Pipe Line Co., except as noted.
[2] Gulf Refining Co. of Louisiana.
[3] Spindletop put on gravity basis Aug. 6.
[4] Prices shown for Grade A under Cow Bayou field applied also to these fields beginning Mar. 10. Moore first posted July 23.
[5] The Texas Co.; put on gravity basis Apr. 28.
[6] Humble Oil & Refining Co.; first posted Apr. 28.
[7] Sun Pipe Line Co.; put on gravity basis June 8.
[8] Posted by Humble Oil & Refining Co. Mar. 10, and by Sun Pipe Line Co. Mar. 17.
[9] Also Humble Oil & Refining Co. and The Texas Co. Met by Sun Pipe Line Co. Apr. 30.
[10] Also Humble Oil & Refining Co. The Texas Co. same date quoted all Gulf coast heavy, Grade B, and light below 25° at $1.35. Met by Sun Pipe Line Co. May 16.
[11] Also The Texas Co. Met by Sun Pipe Line Co. June 9.
[12] Spindletop only. Grades 25 to 31.9° met by The Texas Co. Aug. 9. Grades 25 to 31.9°—5 cents lower each grade—posted by Sun Pipe Line Co. Aug. 10.
[13] All grades except Spindletop. Met by The Texas Co. Aug. 31, and Sun Pipe Line Co. Sept. 1. Grades to 35° and above posted by Humble Oil & Refining Co. Aug. 30.
[14] Spindletop only. Grades 25 to 31.9° posted by Humble Oil & Refining Co. Aug. 30, and met by The Texas Co. Aug. 31, and by Sun Pipe Line Co. Sept. 1.
[15] All grades. Met by The Texas Co. and Humble Oil & Refining Co. (grades to 35° and above) Nov. 10 ,and by Sun Pipe Line Co. Nov. 11.
[16] Exclusive of Spindletop.
[17] Spindletop only.

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Date	Rocky Mountain field[1]																				
	Byron	Lake Basin	Big Muddy, Rock Creek	Cat Creek, Elk Basin, Greybull, Torchlight, Lance Creek, Osage	Grass Creek		Hamilton Dome	Lander	Lost Soldier[2]	Mule Creek	Pilot Butte	Rex Lake	Salt Creek								
					Light	Heavy							28–28.9°	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°
Jan. 1	$2.00	$1.90	$1.75	$1.90	$1.90	$0.90	$1.35	$0.85	$1.10	$1.25	$1.5014	-------	$1.40	$1.23	$1.31	$1.39	$1.47	$1.55	$1.63	$1.71	$1.79
Feb. 1	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.48	1.56	1.64	1.72	1.80	1.88	1.96	2.04
Feb. 2	2.25	2.15	2.00	2.15	2.15	-------	-------	-------	1.35	1.50	1.7514	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
May 15	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.65	1.73	1.81	1.89	1.97	2.05	2.13	2.21	2.29
May 17	-------	2.40	2.25	2.40	2.40	-------	-------	-------	1.60	1.75	-------	$1.45	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nov. 17	-------	-------	1.85	2.00	2.00	-------	-------	-------	-------	1.45	-------	1.25	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90
Average for year	2.23	2.28	2.09	2.24	2.24	.90	1.35	.85	1.46	1.60	1.73	1.41	1.54	1.59	1.67	1.75	1.82	1.90	1.98	2.05	2.13

Date	Rocky Mountain field[1]—Continued																			
	Salt Creek—Continued																Sunburst	Artesia	Hogback	Florence
	37° and above																			
Jan. 1	$1.87																$1.35	$1.35	$1.95	$1.35
Jan. 8																	1.15	-------	-------	-------
Jan. 25																	-------	1.45	-------	-------
	37–37.9°	38–38.9°	39–39.9°	40–40.9°	41–41.9°	42–42.9°	43–43.9°	44–44.9°	45–45.9°	46–46.9°	47–47.9°	48–48.9°	49–49.9°	50–50.9°	51–51.9°	52° and above				
Feb. 1	$2.12	$2.20	$2.28	$2.36	$2.44	$2.52	$2.60	$2.68	$2.76	$2.84	$2.92	$3.00	$3.08	$3.16	$3.24	$3.32	-------	-------	-------	-------
Feb. 2	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.70	2.20	-------
May 6	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.05	-------	-------	-------
May 15	2.37	2.45	2.53	2.61	2.69	2.77	2.85	2.93	3.01	3.09	3.17	3.25	3.33	3.41	3.49	3.57	-------	-------	-------	-------
May 17	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.95	2.45	1.60
Sept. 8	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.15	-------	-------	-------
Sept. 14	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.25	-------	-------	-------
Oct. 5	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	1.35	-------	-------	-------
Nov. 17	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	-------	1.65	-------	-------
Average for year	2.21	2.27	2.34	2.41	2.48	2.55	2.62	2.69	2.76	2.83	2.90	2.97	3.04	3.11	3.18	3.25	1.17	1.79	2.33	1.51

[1] The Ohio Oil Co. and Midwest Refining Co.

[2] Producers and Refiners Corporation.

Field and date of change	California [1]													
	14–14.9°	15–15.9°	16–16.9°	17–17.9°	18–18.9°	19–19.9°	20–20.9°	21–21.9°	22–22.9°	23–23.9°	24–24.9°	25–25.9°	26–26.9°	27–27.9°	28–28.9°
Long Beach:															
Jan. 1	$0.85	$0.87	$0.90	$0.94	$0.98	$1.02	$1.06	$1.10	$1.14	$1.18	$1.22	$1.26	$1.30	$1.34	$1.38
Mar. 11						1.04	1.10	1.16	1.22	1.28	1.34	1.40	1.46	1.52	1.58
Average for year	.85	.87	.90	.94	.98	1.04	1.09	1.15	1.20	1.26	1.32	1.37	1.43	1.49	1.54
Rosecrans:															
Jan. 1											1.22	1.26	1.30	1.34	1.38
Mar. 11	.85	.87	.90	.94	.98	1.04	1.10	1.16	1.22	1.28	1.34	1.40	1.46	1.52	1.58
Average for year	.85	.87	.90	.94	.98	1.04	1.10	1.16	1.22	1.28	1.32	1.37	1.43	1.49	1.54
Dominguez:															
Jan. 1											1.22	1.26	1.30	1.34	1.38
Mar. 11											1.34	1.40	1.46	1.52	1.58
Average for year											1.32	1.37	1.43	1.49	1.54
Sante Fe Springs:															
Jan. 1											.97	1.05	1.13	1.21	1.28
Mar. 11							.89	.91	.94	.97	1.02	1.08	1.16	1.24	1.32
Average for year							.89	.91	.94	.97	1.01	1.07	1.15	1.23	1.31
Inglewood-Torrance:															
Jan. 1	.85	.87	.90	.94	.98	1.02	1.06	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38
Mar. 11						1.04	1.10	1.16	1.22	1.28	1.34	1.40	1.46	1.52	1.58
Average for year	.85	.87	.90	.94	.98	1.04	1.09	1.15	1.20	1.26	1.32	1.37	1.43	1.49	1.54
Huntington Beach:															
Jan. 1	.85	.87	.90	.94	.98	1.02	1.06	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38
Mar. 11						1.04	1.10	1.16	1.22	1.28	1.34	1.40	1.46	1.52	1.58
Average for year	.85	.87	.90	.94	.98	1.04	1.09	1.15	1.20	1.26	1.32	1.37	1.43	1.49	1.54
Richfield-Brea Olinda:															
Jan. 1	.85	.87	.90	.94	.98	1.02	1.06	1.10	1.14	1.18	1.22	1.26	1.30	1.34	1.38
Mar. 11						1.04	1.10	1.16	1.22	1.28	1.34	1.40	1.46	1.52	1.58
Average for year	.85	.87	.90	.94	.98	1.04	1.09	1.15	1.20	1.26	1.32	1.37	1.43	1.49	1.54

[1] Standard Oil Co. (California).

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Field and date of change	California [1]—Continued													
	[illegible]	15–15.9°	16–16.9°	17–17.9°	18–18.9°	19–19.9°	20–20.9°	21–21.9°	22–22.9°	23–23.9°	24–24.9°	25–25.9°	26–26.9°	27–27.9°	28–28.9°
Whittier-La Habra:															
Jan. 1	$0.85	$0.85	$0.85	$0.85	$0.85	$0.85	$0.87	$0.89	$0.91						
Mar. 11					.86	.87	.89	.91	.94						
Average for year	.85	.85	.85	.85	.86	.87	.89	.91	.93						
Montebello:															
Jan. 1	.85	.85	.85	.85	.85	.85	.87	.89	.91	$0.94	$0.97	$1.00	$1.03	$1.06	$1.09
Mar. 11					.86	.87	.89	.91	.94	.97	1.01	1.05	1.09	1.13	1.17
Average for year	.85	.85	.85	.85	.86	.87	.89	.91	.93	.96	1.00	1.04	1.08	1.12	1.15
Coalinga:															
Jan. 1	.75	.75	.75	.75	.75	.75	.79	.84	.89	.94	.99	1.04	1.09	1.14	1.19
Mar. 11								.86	.93	1.00	1.07	1.14	1.21	1.28	1.35
Average for year	.75	.75	.75	.75	.75	.75	.79	.86	.92	.99	1.05	1.12	1.19	1.25	1.32
Midway-Sunset-Elk Hills:															
Jan. 1	.75	.75	.75	.75	.75	.75	.79	.84	.92	1.00	1.08	1.16	1.24	1.32	1.40
Mar. 11							.82	.90	1.00	1.11	1.22	1.33	1.44	1.55	1.66
Average for year	.75	.75	.75	.75	.75	.75	.81	.89	.98	1.09	1.19	1.30	1.40	1.51	1.61
Lost Hills-Belridge:															
Jan. 1	.75	.75	.75	.75	.75	.75	.79	.84	.92	1.00	1.08	1.16	1.24	1.32	1.40
Mar. 11							.82	.90	1.00	1.11	1.22	1.33	1.44	1.55	1.66
Average for year	.75	.75	.75	.75	.75	.75	.81	.89	.98	1.09	1.19	1.30	1.40	1.51	1.61
Coyote:															
Jan. 1	.85	.85	.85	.85	.85	.85	.88	.94	1.00	1.06	1.12	1.18	1.24	1.30	1.36
Mar. 11					.86	.87	.90	.98	1.06	1.14	1.22	1.30	1.38	1.46	1.54
Average for year	.85	.85	.85	.85	.86	.87	.90	.97	1.05	1.12	1.20	1.28	1.35	1.43	1.51
Wheeler Ridge:															
Jan. 1	.75	.75	.75	.75	.75	.75	.78	.81	.84	.87	.90	.93	.96	.99	
Mar. 11									.85	.89	.93	.97	1.01	1.05	
Average for year	.75	.75	.75	.75	.75	.75	.78	.81	.85	.89	.92	.96	1.00	1.04	

Newhall-McKittrick-Kern River:															
Jan. 1	.75	.75	.75	.75	.75	.75									
Average for year	.75	.75	.75	.75	.75	.75									
Santa Maria:															
Jan. 1	.85	.85	.85	.85	.85	.85	.89	.93	.98	1.03	1.08	1.13	1.18	1.23	1.28
Mar. 11							.90	.97	1.04	1.11	1.18	1.25	1.32	1.39	1.46
Average for year	.85	.85	.85	.85	.85	.85	.90	.96	1.03	1.09	1.16	1.23	1.29	1.36	1.43
Salt Lake:															
Jan. 1	.85	.85	.85	.85	.85	.85									
Average for year	.85	.85	.85	.85	.85	.85									
Ventura:															
Jan. 1	.85	.85	.85	.85	.85	.85	.89	.93	.98	1.03	1.08	1.13	1.18	1.23	1.28
Mar. 11							.90	.97	1.04	1.11	1.18	1.25	1.32	1.39	1.46
Average for year	.85	.85	.85	.85	.85	.85	.90	.96	1.03	1.09	1.16	1.23	1.29	1.36	1.43

[1] Standard Oil Co. (California).

Posted price per barrel of petroleum at wells in 1926, by grades, with dates of change—Continued

Field and date of change	California [1]—Continued													
	29–29.9°	30–30.9°	31–31.9°	32–32.9°	33–33.9°	34–34.9°	35–35.9°	36–36.9°	37–37.9°	38–38.9°	39–39.9°	40–40.9°	41–41.9°	42° and above
Long Beach:														
Jan. 1	$1.42	$1.46	$1.52											
Mar. 11	1.64	1.70	1.76	$1.84										
Average for year	1.60	1.65	1.71											
Rosecrans:														
Jan. 1	1.42	1.46	1.52	1.58	$1.64	$1.70	$1.76	$1.84	$1.92	$2.00	$2.08	$2.16	$2.24	$2.30
Mar. 11	1.64	1.70	1.76	1.84	1.92	2.00	2.08	2.16	2.24	2.34	2.44	2.54	2.64	2.74
Average for year	1.60	1.65	1.71	1.79	1.87	1.94	2.02	2.10	2.18	2.28	2.37	2.47	2.56	2.66
Dominguez:														
Jan. 1	1.42	1.46	1.52	1.58	1.64	1.70	1.76	1.84	1.92	2.00	2.08	2.16	2.24	2.30
Mar. 11	1.64	1.70	1.76	1.84	1.92	2.00	2.08	2.16	2.24	2.34	2.44	2.54	2.64	2.74
Average for year	1.60	1.65	1.71	1.79	1.87	1.94	2.02	2.10	2.18	2.28	2.37	2.47	2.56	2.66
Santa Fe Springs:														
Jan. 1	1.34	1.40	1.46	1.52	1.60	1.68	1.76	1.84	1.92	2.00				
Mar. 11	1.40	1.48	1.60	1.72	1.84	1.96	2.08	2.16	2.24	2.34	2.44			
Average for year	1.39	1.46	1.57	1.68	1.79	1.91	2.02	2.10	2.18	2.28				
Huntington Beach:														
Jan. 1	1.42	1.46												
Mar. 11	1.64	1.70	1.76	1.84										
Average for year	1.60	1.65												
Richfield-Brea Olinda:														
Jan. 1	1.42	1.46												
Mar. 11	1.64	1.70												
Average for year	1.60	1.65												

Montebello:															
Jan. 1	1.12	1.15													
Mar 11	1.21	1.25													
Average for year	1.19	1.23													
Coalinga:															
Jan. 1	1.24	1.29	1.34	1.39	1.44	1.49	1.54								
Mar. 11	1.42	1.49	1.56	1.63	1.70	1.77	1.84								
Average for year	1.39	1.45	1.52	1.58	1.65	1.72	1.78								
Midway-Sunset-Elk Hills:															
Jan. 1	1.48	1.56	1.64	1.72	1.80										
Mar. 11	1.77	1.88	1.99	2.10	2.21										
Average for year	1.72	1.82	1.92	2.03	2.13										
Lost Hills-Belridge:															
Jan. 1	1.48	1.56	1.64	1.72	1.80	1.88									
Mar. 11	1.77	1.88	1.99	2.10	2.21	2.32									
Average for year	1.72	1.82	1.92	2.03	2.13	2.24									
Coyote:															
Jan. 1	1.42	1.48													
Mar. 11	1.62	1.70													
Average for year	1.58	1.66													
Santa Maria:															
Jan. 1	1.33	1.38													
Mar. 11	1.53	1.60													
Average for year	1.49	1.56													
Ventura:															
Jan. 1	1.33	1.38	1.43	1.47	1.51	1.55	1.60								
Mar. 11	1.53	1.60	1.67	1.73	1.79	1.85	1.92								
Average for year	1.49	1.56	1.62	1.68	1.74	1.79	1.86								

[1] Standard Oil Co. (California).

WELLS

From 1859 to 1926 approximately 717,000 wells were drilled for oil and gas in the United States, of which nearly 145,000, or 20 per cent, were dry holes.

In 1926 there were 29,319 wells completed, compared with 25,623 in 1925, a gain of 14 per cent. In only one year, 1920, has the 1926 record for completions been surpassed. Of the wells completed during 1926, 19,013, or 65 per cent, were oil wells, 2,341, or 8 per cent, gas wells, and the remainder, 7,965, or 27 per cent, dry holes, indicating a slight increase in the percentage of failures over 1925 but a decline in the percentage of gas wells. In 1926, as in 1925, drilling activity was at its peak in July. The late season decline in the number of completions was not as marked in 1926 as usual.

As would be expected, in many of the new fields there was considerable drilling activity; some outstanding examples of such fields are the Urania field in La Salle Parish, La., the Kevin-Sunburst field in Montana, the Seminole field in Oklahoma, and the Panhandle district, the largest part of which is in Hutchinson County, Tex. Many of the older producing areas, such as Archer County, Tex., the Bradford district in Pennsylvania, and Creek and Osage Counties, Okla., reported a large number of wells drilled in 1926, although in the absence of much flush production the average initial output of these wells was not large. Because of the discovery of prolific deep sands at Spindletop, the Texas Gulf coast area may be credited with the largest indicated initial daily production per well in 1926—950 barrels. The estimated average initial production at Smackover, which ranked first in this respect in 1925, dropped to about 100 barrels in 1926, or one-tenth of the previous year.

The accompanying table, based on reports of companies that operate gathering lines, shows approximate number of producing oil wells in the United States on December 31, 1924–1926, and the average daily production per well.

Approximate number of producing oil wells in the United States, December 31, 1924–1926

State	1924		1925		1926	
	Approximate number of wells	Average production per well per day (barrels)	Approximate number of wells	Average production per well per day (barrels)	Approximate number of wells	Average production per well per day (barrels)
Arkansas	3,050	33.5	4,100	49.5	4,500	29.6
California [1]	[1] 11,320	53.6	[1] 11,070	56.6	[1] 11,330	58.1
Colorado	70	25.8	80	64.1	130	60.3
Illinois	16,400	1.2	16,280	1.3	16,270	1.3
Indiana:						
Southwestern	1,020	1.5	990	1.7	990	1.9
Northeastern	1,120	.5	1,010	.4	1,060	.3
Total Indiana	2,140	1.0	2,000	1.0	2,050	1.1
Kansas	18,000	4.0	18,600	5.6	19,230	6.0
Kentucky	12,450	1.5	13,100	1.3	13,300	1.3
Louisiana:						
Gulf coast	200	37.4	260	43.2	240	43.7
Northern	3,350	13.7	3,490	12.3	3,950	13.2
Total Louisiana	3,550	15.0	3,750	14.4	4,190	14.9
Michigan			[2]		90	9.3
Montana	380	18.9	590	21.1	830	14.3
New Mexico	[2]		140	31.8	230	23.6
New York	15,000	.3	15,580	.3	16,150	.4
Ohio:						
Central and eastern	20,900	.6	21,120	.7	21,150	.7
Northwestern	18,000	.3	17,940	.3	18,100	.3
Total Ohio	38,900	.5	39,060	.5	39,250	.5
Oklahoma	60,500	8.1	59,400	7.7	61,600	9.3
Pennsylvania	74,350	.3	75,900	.3	76,800	.3
Texas:						
Gulf coast	2,220	28.2	2,430	30.8	2,520	64.6
Rest of State	18,130	15.9	20,970	12.8	26,510	16.7
Total Texas	20,350	17.2	23,400	14.7	29,030	20.9
West Virginia	20,000	.8	19,940	.8	20,150	.8
Wyoming	2,570	26.9	3,080	24.8	3,400	17.3
Other	[3] 70		[4] 30		[5] 70	
United States	299,100	6.2	306,100	6.5	318,600	7.4

[1] American Petroleum Institute; does not include wells temporarily shut in.
[2] Included under "Other."
[3] Alaska, New Mexico, Tennessee, and Utah.
[4] Alaska, Michigan, Tennessee, and Utah.
[5] Alaska, Tennessee, and Utah.

Wells drilled for oil and gas in the United States, 1859–1926

Year	Wells completed	Dry holes		Year	Wells completed	Dry holes		Year	Wells completed	Dry holes	
		Total	Percentage			Total	Percentage			Total	Percentage
1859-1907	[1] 287,922	[1] 54,940	19	1914	23,137	4,142	18	1921	21,937	5,160	24
1908	16,909	3,214	19	1915	14,157	2,981	21	1922	24,689	5,332	22
1909	18,327	3,404	19	1916	24,619	4,039	16	1923	24,438	5,883	24
1910	14,940	2,422	16	1917	23,407	4,851	21	1924	21,888	5,044	23
1911	13,768	2,363	17	1918	25,687	5,613	22	1925	25,623	6,734	26
1912	17,180	2,855	17	1919	29,173	5,986	21	1926	29,319	7,965	27
1913	25,590	4,282	17	1920	33,911	7,364	22		716,621	144,574	20

[1] From Papers on the Conservation of Mineral Resources, U. S. Geol. Survey Bull. 394, 1909, pp. 30–50.

Wells drilled for oil and gas in the United States, 1925–26, by months [1]

	January	February	March	April	May	June	July	August	September	October	November	December	The year	
													Total	Percentage
1925														
Oil	884	993	1,091	1,568	1,675	1,709	1,791	1,581	1,504	1,420	1,196	1,147	16,559	65
Gas	165	171	185	203	177	184	207	206	183	205	231	213	2,330	9
Dry	376	432	492	594	601	578	640	701	590	603	593	534	6,734	26
	1,425	1,596	1,768	2,365	2,453	2,471	2,638	2,488	2,277	2,228	2,020	1,894	25,623	100
1926														
Oil	1,168	1,133	1,307	1,463	1,515	1,697	1,856	1,858	1,745	1,962	1,749	1,560	19,013	65
Gas	192	175	194	190	173	185	208	209	178	194	231	212	2,341	8
Dry	603	499	623	573	695	665	879	737	656	698	694	643	7,965	27
	1,963	1,807	2,124	2,226	2,383	2,547	2,943	2,804	2,579	2,854	2,674	2,415	29,319	100

[1] California dry gas wells not reported.

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts [1]

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Arkansas:					
Bradley			3	3	
Columbia	14		7	21	14
Lafayette	4		11	15	58
Nevada	32	3	11	46	134
Ouachita	126	19	39	184	107
Union	561	43	128	732	100
Miscellaneous			27	27	
	737	65	226	1,028	101
Total, 1925	1,202	106	298	1,606	1,072
California:					
Coalinga	20			20	42
Coyote	2		1	3	174
Dominguez	11			11	412
Elk Hills	14		9	23	290
Fullerton	19		4	23	864
Huntington Beach	126		11	137	890
Inglewood	43		10	53	462
Kern River	31		15	46	167
Long Beach	259		39	298	243
Lost Hills-Belridge	5		2	7	31
McKittrick	9		8	17	25
Midway-Sunset	161		21	182	135
Montebello	26	[2]	3	29	168
Newport	7		1	8	22
Richfield	20		4	24	490
Rosecrans	33		21	54	561
Santa Fe Springs	12		6	18	205
Santa Maria	3		10	13	178
Seal Beach	5		2	7	2,110
Torrance	52		4	56	144
Ventura Avenue	32		1	33	2,715
Ventura-Newhall	12		23	35	123
Wheeler Ridge	6			6	116
Whittier	5		3	8	44
Miscellaneous			86	86	
	913	[2]	284	1,197	429
Total, 1925	948	[2]	338	1,286	535

[1] For States east of California, from Oil and Gas Journal; for California, from American Petroleum Institute.
[2] Not reported.

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Colorado:					
Fremont	16		4	20	41
La Plata	1			1	6
Larimer	18		9	27	496
Las Animas	1	1		2	20
Moffat-Iles	8	2	5	15	852
Routt	2		4	6	18
Miscellaneous		2	16	18	
Total, 1925	46	5	38	89	358
	19	6	34	59	526
Illinois:					
Clark	42		6	48	20
Crawford	57	5	10	72	9
Jackson	1		2	3	10
Jasper	3		4	7	3
Lawrence	21		4	25	24
Marion	7		7	14	11
Morgan	2		3	5	15
Wabash	96	2	70	168	62
Miscellaneous	2		19	21	3
Total, 1925	231	7	125	363	34
	170	5	70	245	63
Indiana:					
Northeastern—					
Adams	37	3	3	43	18
Allen	3	1		4	8
Delaware	1		1	2	12
Huntington	4			4	13
Jay	12		3	15	17
Randolph	1			1	60
Miscellaneous	3	5	5	13	17
Total, 1925	61	9	12	82	17
	45		16	61	16
Southwestern—					
Daviess	23		8	31	49
Gibson	5	3	15	23	30
Knox	3		6	9	8
Pike	43	2	8	53	36
Sullivan	8	7	6	21	4
Vigo	1		1	2	150
Miscellaneous		3	6	9	
Total, 1925	83	15	50	148	36
	37	5	25	67	24
Total Indiana, 1926	144	24	62	230	28
1925	82	5	41	128	20
Kansas:					
Anderson	251	6	41	298	68
Butler	149	1	96	246	105
Chase	4	4	21	29	66
Chautauqua-Elk	94	21	60	175	76
Cowley	89	7	52	148	139
Greenwood	599	3	199	801	132
Lyon	52	1	67	120	139
Marion	8	1	20	29	252
Miami	16		14	30	11
Montgomery	34	21	52	107	50
Neosho	25	4	8	37	16
Ottawa	4			4	7
Rice	15		6	21	226
Russell	41		4	45	155
Sumner	24	4	18	46	744
Woodson	20	1	15	36	112
Miscellaneous	33	22	111	166	15
Total, 1925	1,458	96	784	2,338	119
	1,281	86	636	2,003	162

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Kentucky:					
Allen	72		35	107	5
Barren	215	3	53	271	12
Clinton	3			3	233
Cumberland-Monroe	35	1	11	47	109
Elliott	5		1	6	6
Estill	59		14	73	7
Floyd	5	26	3	34	22
Johnson-Magoffin	113	4	7	124	11
Lawrence-Johnson	138			138	8
Lee-Owsley	22	5	6	33	10
Morgan	10		6	16	4
Owensboro	145	2	74	221	19
Powell	2			2	4
Simpson	7		1	8	5
Warren	73		32	105	11
Wayne	27		29	56	4
Wolfe	12		4	16	8
Miscellaneous	6	7	4	17	88
	949	48	280	1,277	16
Total, 1925	1,060	99	418	1,577	15
Louisiana:					
Gulf coast—					
Edgerley	12		3	15	93
Jennings	27		16	43	112
Lockport	23		6	29	1,120
Vinton	42		25	67	230
Miscellaneous	7		9	16	240
	111		59	170	371
Total, 1925	73		63	136	375
Northern—					
Bossier	16	9	21	46	20
Caddo	194	27	41	262	94
Claiborne	4		12	16	28
De Soto	4	5	11	20	73
Grant	5		29	34	31
La Salle	350	1	89	440	166
Monroe		68	15	83	
Webster	22	7	14	43	85
Winn	11		20	31	228
Miscellaneous	1	1	69	71	10
	607	118	321	1,046	135
Total, 1925	202	85	125	412	107
Total Louisiana, 1926	718	118	380	1,216	172
1925	275	85	188	548	178
Michigan:					
Saginaw	85		10	95	22
St. Clair	4		1	5	4
Miscellaneous			5	5	
	89		16	105	21
Total, 1925	(3)		(3)	(3)	(3)
Montana:					
Cat Creek	3		5	8	62
Kevin-Sunburst	260	24	133	417	201
Lake Basin	1		1	2	75
Miscellaneous	2	5	16	23	55
	266	29	155	450	198
Total, 1925	254	14	127	395	214
New Mexico:					
Artesia and Eddy	97		27	124	71
Chaves	2		6	8	12
Lea	1		1	2	300
San Juan	20	1	5	26	141
Miscellaneous			27	27	
	120	1	66	187	83
Total, 1925	152	1	27	180	152

[3] Included under "Other States."

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Ohio:					
Central and eastern—					
Athens	58	46	26	130	5
Coshocton	24	16	12	52	61
Guernsey	23	103	19	145	17
Hocking	63	11	15	89	42
Holmes	100	44	39	183	44
Knox	30	13	18	61	8
Licking	188	13	19	220	28
Medina	17	19	17	53	10
Meigs	15	13	2	30	5
Morgan	76	22	6	104	18
Muskingum	9	----	4	13	58
Noble	24	19	24	67	12
Perry	22	3	10	35	25
Vinton	10	1	----	11	7
Washington	73	9	51	133	8
Wayne	7	29	20	56	12
Miscellaneous	73	123	66	262	4
	812	484	348	1,644	23
Total, 1925	721	421	325	1,467	18
Northwestern—					
Allen	34	----	----	34	20
Auglaize	16	1	7	24	15
Darke	10	2	2	14	31
Hancock	68	----	2	70	19
Hardin	21	2	2	25	32
Lucas	11	----	----	11	11
Mercer	45	2	2	49	10
Ottawa	36	1	1	38	15
Sandusky	41	2	2	45	8
Shelby	41	2	5	48	14
Van Wert	7	----	----	7	18
Wood	77	----	4	81	21
Miscellaneous	6	1	7	14	20
	413	13	34	460	17
Total, 1925	512	26	89	627	15
Total, Ohio, 1926	1,225	497	382	2,104	21
1925	1,233	447	414	2,094	17
Oklahoma:					
Caddo	20	1	5	26	46
Carter	188	21	46	255	158
Comanche	9	----	26	35	62
Creek	481	54	200	735	144
Garfield	181	1	51	233	552
Garvin	22	3	20	45	43
Grady	48	51	19	118	98
Hughes	84	6	67	157	464
Jefferson	41	3	18	62	169
Kay	192	31	81	304	735
Lincoln	136	1	48	185	299
Muskogee-Wagoner	54	40	120	214	57
Nowata	49	4	20	73	13
Okfuskee	73	33	73	179	244
Okmulgee	263	78	235	576	83
Osage	516	41	160	717	180
Pawnee	121	8	57	186	105
Payne	83	19	37	139	257
Rogers	53	6	28	87	16
Seminole	256	11	51	318	1,417
Stephens-Cotton	89	31	111	231	47
Tulsa	104	34	127	265	103
Washington	47	4	19	70	10
Miscellaneous	9	17	116	142	397
	3,119	498	1,735	5,352	316
Total, 1925	2,929	471	1,578	4,978	300

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Pennsylvania and New York:					
Allegany	331	4	4	339	2
Bradford	1,490	3	9	1,502	2
Butler-Armstrong	79	30	40	149	4
Middle Field	82	7	6	95	3
Venango-Clarion	316	45	36	397	2
Southwestern Pennsylvania—					
Allegheny	23	16	12	51	4
Beaver	6	2	5	13	3
Greene	33	80	28	141	118
Washington	10	8	11	29	22
	2,370	195	151	2,716	4
Total, 1925	1,989	223	151	2,363	3
Tennessee:					
Clay	25		3	28	134
Overton	1		2	3	20
Miscellaneous		1	3	4	
	26	1	8	35	130
Total, 1925	19	4	35	58	222
Texas:					
Gulf coast—					
Barbers Hill	9		4	13	333
Batson	56		22	78	61
Big Creek	12		3	15	849
Blue Ridge	12		6	18	958
Boling	35		35	70	986
Goose Creek	23		21	44	367
High Island	10		17	27	180
Hull	120		27	147	639
Humble	22		12	34	226
Markham	2		5	7	275
Nash	9		6	15	727
Orange	86		36	122	675
Orchard	2			2	1,650
Piedras Pintas	2		10	12	263
Pierce Junction	35		8	43	641
Saratoga	2		16	18	475
Sourlake	74		14	88	536
South Liberty	9		6	15	1,049
Spindletop	149		39	188	2,535
West Columbia	7		7	14	153
Miscellaneous	35		77	112	24
	711		371	1,082	950
Total, 1925	724	9	285	1,018	475
Rest of State—					
North central and east—					
Archer	793		570	1,363	87
Brown	557	9	248	814	148
Callahan	89	2	62	153	81
Clay	14	1	35	50	26
Coleman	27	8	88	123	122
Cooke	42	3	16	61	65
Eastland	49	26	106	181	61
Jack	26		50	76	49
Limestone	72	2	29	103	804
Luling	24	2	4	30	375
Lytton Springs	21		11	32	188
Mirando	282	92	49	423	244
Montague	336	8	41	385	71
Navarro	11	2	15	28	380
Palo Pinto	7	6	23	36	64
Rockdale-Minerva	49	2	4	55	20
Shackelford	199	11	141	351	269
Somerset	26		2	28	12
Stephens	85	24	58	167	119
Throckmorton	16	5	37	58	400
Wichita	490		296	786	44

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Texas—Continued.					
Rest of State—Continued.					
North central and east—Continued.					
Wilbarger	408	3	93	504	126
Young	287	----	270	557	58
Miscellaneous	25	24	181	230	95
	3,935	230	2,429	6,594	127
Total, 1925	3,175	157	1,744	5,076	224
Panhandle—					
Carson	27	9	13	49	356
Gray	77	----	7	84	341
Hutchinson	649	13	6	668	514
Wheeler	11	7	4	22	217
Miscellaneous	----	3	5	8	----
	764	32	35	831	487
Total, 1925	35	12	11	58	269
West Texas—					
Crane	52	----	8	60	209
Crockett	23	----	12	35	124
Garza	1	----	2	3	7
Howard	18	----	4	22	71
Jones	2	----	3	5	811
Loving	1	----	2	3	35
Mitchell	39	----	8	47	68
Reagan	83	1	15	99	711
Scurry	1	----	2	3	10
Sterling	1	----	8	9	2
Taylor	1	----	2	3	6
Upton	155	----	25	180	382
Winkler	1	----	----	1	125
Miscellaneous	----	----	48	48	----
	378	1	139	518	364
Total, 1925	80	3	59	142	1,025
Total "Rest of State," 1926	5,077	263	2,603	7,943	199
1925	3,290	172	1,814	5,276	244
Total Texas, 1926	5,788	263	2,974	9,025	291
1925	4,014	181	2,099	6,294	286
Utah:					
Grand	----	1	1	2	----
	----	1	1	2	----
Total, 1925	1	1	2	4	400
West Virginia:					
Boone	4	35	8	47	30
Clay	83	15	1	99	23
Doddridge	23	16	8	47	11
Gilmer	2	10	14	26	29
Harrison	3	16	2	21	3
Kanawha	1	38	4	43	4
Lincoln	2	77	2	81	5
Marshall	21	19	13	53	13
Mingo	7	4	3	14	36
Pleasants	27	3	19	49	9
Ritchie	70	60	34	164	42
Roane	18	24	6	48	11
Wetzel-Tyler	30	28	17	75	7
Wirt	12	3	4	19	2
Wood	44	----	18	62	6
Miscellaneous	69	127	58	254	6
	416	475	211	1,102	17
Total, 1925	379	569	195	1,143	11

Wells drilled for oil and gas in the United States in 1926, by States and by counties or districts—Continued

State and county or district	Oil	Gas	Dry	Total	Estimated average initial daily production per well (barrels)
Wyoming:					
Big Horn Basin	12		17	29	146
Big Muddy	5			5	23
Fremont		1	6	12	215
Lance Creek	2		2	4	250
Lincoln and Uinta	3		1	4	88
Lost Soldier and Carbon	19	13	17	49	230
Natrona	3	2	9	14	185
Osage	5		3	8	18
Rock Creek	3		7	10	138
Salt Creek	339		11	350	256
Miscellaneous	2	1	5	8	8
	398	17	78	493	241
Total, 1925	550	27	74	651	128
Other States,[4] 1926		1	9	10	
1925	2		9	11	30
United States, 1926	19,013	[5] 2,341	7,965	[5] 29,319	194
1925	16,559	[5] 2,330	6,734	[5] 25,623	260

[4] 1925: Michigan and Mississippi; 1926: Alabama and Mississippi.
[5] California dry gas wells not reported.

SPECIFIC GRAVITY OF CRUDE PETROLEUM

The accompanying table gives the estimated specific gravity of the crude petroleum produced in certain fields and districts, as reported by pipe-line and producing companies. The equivalents of "degrees A. P. I." in decimals representing specific gravity are taken from Bureau of Standards Circular 154, National Standard Petroleum Oil Tables.

The highest gravity crude oil produced in quantity in the United States in 1926 was that from the Rattlesnake field in New Mexico. This oil, which comes from the Dakota sand at 800 feet or less, averages about 65° A. P. I. The lowest gravity crude oil produced in quantity, 13.0° A. P. I., was produced at Summerland, Calif.

Estimated average gravity of crude petroleum from various fields in the United States in 1926

District or grade	Degrees A. P. I.	Specific gravity	District or grade	Degrees A. P. I.	Specific gravity
Alaska: Katalla	44.0	0.806	California—Continued.		
Arkansas:			Inglewood	19.5	0.937
Bradley	26.4	.896	Kern River	14.0	.973
El Dorado	34.0	.855	Long Beach	25.8	.900
Irma	14.9	.967	Lost Hills-Belridge	25.5	.901
Lisbon	36.0	.845	McKittrick	14.8	.967
Smackover, light (range 24-29)	25.0	.904	Midway-Sunset	21.7	.924
Smackover, heavy (range 16-23.9)	20.0	.934	Montebello	23.2	.915
Stephens	29.0	.882	Mount Poso	15.5	.963
California:			Richfield	19.5	.937
Coalinga	18.9	.941	Rosecrans	33.0	.860
Coyote	24.3	.908	Santa Fe Springs	33.0	.860
Dominguez	29.4	.879	Santa Maria	16.9	.954
Elk Hills	22.5	.919	Seal Beach	24.0	.910
Huntington Beach	25.6	.901	Summerland	13.0	.979
			Torrance	20.7	.930
			Ventura	30.2	.875
			Whittier	19.1	.940

Estimated average gravity of crude petroleum from various fields in the United States in 1926—Continued

District or grade	Degrees A. P. I.	Specific gravity
Colorado:		
Florence	29.1	0.881
Fort Collins	37.0	.840
Iles Dome	35.0	.850
Moffat	41.0	.820
Rangely	43.5	.809
Tow Creek	35.0	.850
Illinois:		
"Illinois"	33.0	.860
Plymouth	34.2	.854
Waterloo	30.0	.876
Indiana:		
Northeastern ("Indiana")	35.5	.847
Southwestern ("Princeton")	33.0	.860
Kansas:		
Augusta	34.0	.855
Eldorado	36.0	.845
Iola	19.0	.940
Matheson	33.0	.860
Peabody-Elbing	35.0	.850
Rainbow	41.0	.820
Russell County	39.0	.830
Teeter	36.5	.842
Virgil	38.0	.835
Kentucky:		
Ragland	23.2	.915
Ravenna	39.0	.830
Rodemer	29.0	.882
Scottsville	35.0	.850
Somerset (light)	39.0	.830
Somerset (medium)	35.5	.847
Warren County	36.0	.845
Louisiana:		
Bellevue	19.0	.940
Bull Bayou	39.5	.828
Caddo (light)	42.9	.811
Caddo (heavy)	26.2	.897
Cotton Valley	29.0	.882
De Soto	36.0	.845
Edgerley	21.0	.928
Elm Grove	30.5	.874
Haynesville	35.0	.850
Homer	36.0	.845
Jennings	24.5	.907
Lockport	24.8	.905
Starks	21.1	.927
Sweet Lake	29.5	.879
Urania	20.0	.934
Vinton	18.6	.943
Michigan: Saginaw	45.0	.802
Montana:		
Cat Creek	49.0	.784
Elk Basin	43.0	.811
Kevin-Sunburst	32.0	.865
Lake Basin	40.0	.825
New Mexico:		
Artesia	37.0	.840
Hogback	56.0	.755
Rattlesnake	64.8	.721
Table Mesa	64.0	.724
New York	42.0	.816
Ohio:		
Cleveland	38.2	.834
Corning	42.0	.816
Lima	36.3	.843
"Pennsylvania" (Macksburg)	42.5	.812
Wooster	38.1	.834
Oklahoma:		
Braman	41.0	.820
Bristow	33.0	.860
Burbank	38.0	.835
Cement	31.0	.871
Cleveland	37.5	.837
Cromwell	37.0	.830
Cushing	39.0	.830
Davenport	43.2	.810
Oklahoma—Continued.		
Deer Creek	42.5	0.813
Duncan	36.0	.845
Fox	21.7	.924
Garber	43.0	.811
Glenn	34.0	.855
Healdton	29.5	.879
Hewitt	34.0	.855
Papoose	38.5	.832
Seminole	41.0	.820
Thomas	42.0	.816
Tonkawa	42.0	.816
Wewoka	37.5	.837
Pennsylvania:		
Franklin	29.5	.879
"Pennsylvania"	42.0	.816
Tennessee:		
Glen Mary	39.0	.830
Tinsleys Bottom	43.2	.810
Texas:		
Batson	20.6	.930
Big Lake	38.2	.834
Boling	29.0	.882
Breckenridge	38.0	.835
Bruni	18.0	.947
Burkburnett	38.0	.835
Church-Fields	30.0	.876
Electra	40.0	.825
Goose Creek	24.0	.910
Hull	22.5	.919
Humble	23.0	.916
Jones County	40.5	.823
Luling	26.8	.894
Lytton Springs	38.0	.835
McElroy	32.0	.860
Mexia	36.5	.832
Minerva	38.0	.835
Mirando	23.0	.916
Moore	34.5	.852
Nigger Creek	38.5	.832
Nocona	22.0	.922
Orange	22.7	.918
Panhandle	36.0	.845
Piedras Pintas	42.0	.816
Pierce Junction	23.5	.913
Powell	37.5	.837
Randado	21.0	.928
Ranger	37.5	.837
Somerset	33.0	.860
Sourlake	21.7	.924
South Liberty	22.3	.920
Spindletop (light)	27.0	.893
Spindletop (heavy)	22.5	.919
Westbrook	25.0	.904
West Columbia	22.8	.917
Wortham	38.5	.832
Yates	30.4	.874
West Virginia:		
Cabell	39.3	.829
Cabin Creek	48.0	.788
Kellys Creek	45.0	.802
"Pennsylvania"	43.0	.811
Volcano	29.0	.882
Wyoming:		
Big Muddy	33.0	.860
Elk Basin	43.0	.811
Grass Creek (light)	45.0	.802
Grass Creek (heavy)	21.0	.928
Hamilton Dome	25.0	.904
La Barge	30.0	.876
Lance Creek	42.0	.816
Lander	23.0	.916
Lost Soldier	31.5	.868
Poison Spider	15.0	.966
Rex Lake	32.3	.864
Rock Creek	37.4	.838
Salt Creek	36.0	.845
Teapot	36.4	.843

SURVEY OF PETROLEUM PIPE LINES AND STORAGE CAPACITY FOR CRUDE OIL AND REFINED PRODUCTS

A survey of the petroleum pipe lines by the Bureau of Mines as of May, 1926, showed that at that time there was in the United States a total of slightly more than 90,000 miles of pipe lines varying in diameter from 2 to 16 inches, with a cubic capacity of approximately 15,750,000 barrels. The total pipe-line mileage was about equally divided between trunk lines and gathering lines, although the capacity of the former was about four times that of the latter. Oklahoma, with 19,180 miles of pipe lines, led in total mileage, with Texas second and Pennsylvania third. California, although the leading producer, ranked relatively low in total mileage, as many of the fields are near the consuming centers.

Exclusive of producers' storage at wells, the grand total of tankage available in the United States for the storage of crude petroleum at tank farms and at refineries and of petroleum products at refineries in May, 1926, amounted to more than 800,000,000 barrels of 42 United States gallons. Of this total nearly 500,000,000 barrels was at tank farms and more than 300,000,000 at refineries. Of the latter, 80,000,000 barrels was crude storage, hence the total available tankage for crude in the United States in May, 1926, was approximately 580,000,000 barrels. Allowing for B. S., water, and for tankage not filled in general practice, there was 140,000,000 barrels of unfilled storage available for use. California, with nearly 200,000,000 barrels of tankage, led in storage capacity, followed in order by Texas and Oklahoma. Four types of storage are common—steel, earthen, concrete, and wooden. Steel storage is by far the most widely used and comprised 80 per cent of the total.

Summary of petroleum pipe-line mileage and capacity in 1924 and in May, 1926, by States

State	1924 [1]						May, 1926					
	Trunk lines		Gathering lines		Total		Trunk lines		Gathering lines		Total	
	Miles	Capacity (barrels)	Miles	Capacity (barrels)	Miles	Capacity (barrels)	Miles	Capacity (barrels)	Miles	Capacity (barrels)	Miles	Capacity (barrels)
Arkansas	591	186,400	645	75,300	1,236	261,700	830	256,100	940	117,500	1,770	373,600
California	3,078	988,900	1,461	207,600	4,539	1,196,500	3,210	1,046,100	1,800	245,700	5,010	1,291,800
Colorado			29	1,100	29	1,100	8	600	60	4,900	68	5,500
Illinois	1,937	685,400	1,218	141,900	3,155	827,300	1,800	685,800	1,170	139,900	2,970	825,700
Indiana	1,469	514,100	503	29,900	1,972	544,000	1,540	528,500	450	27,900	1,990	556,400
Iowa	77	37,700			77	37,700	77	37,700			77	37,700
Kansas	2,542	801,400	2,762	214,300	5,304	1,015,700	2,430	812,700	3,220	250,000	5,650	1,062,700
Kentucky	592	50,100	1,383	48,600	1,975	98,700	570	53,500	1,660	59,800	2,230	113,300
Louisiana	1,751	647,500	806	77,300	2,557	724,800	1,890	690,100	720	70,700	2,610	760,800
Maryland	36	4,700			36	4,700	33	4,300			33	4,300
Michigan	138	26,200			138	26,200	138	25,900			138	25,900
Missouri	2,485	993,400			2,485	993,400	2,490	993,100			2,490	993,100
Montana	93	9,100	20	400	113	9,500	130	9,900	20	400	150	10,300
Nebraska	377	248,700			377	248,700	404	256,000			404	256,000
New Jersey	476	116,900			476	116,900	480	120,200			480	120,200
New Mexico							70	5,700	20	900	90	6,600
New York	1,192	217,300	687	30,200	1,879	247,500	1,200	218,900	710	26,100	1,910	245,000
Ohio	2,623	768,000	6,192	278,800	8,815	1,046,800	2,690	767,600	6,320	284,200	9,010	1,051,800
Oklahoma	7,695	1,734,400	9,689	673,400	17,384	2,407,800	8,220	1,847,600	10,960	775,900	19,180	2,623,500
Pennsylvania	5,274	1,100,600	6,094	201,300	11,368	1,301,900	5,260	1,065,000	6,340	210,300	11,600	1,275,300
Tennessee			5	100	5	100			30	600	30	600
Texas	7,379	2,136,000	4,665	504,100	12,044	2,640,100	9,470	2,747,900	6,060	660,900	15,530	3,408,800
West Virginia	419	71,100	4,957	313,900	5,376	385,000	400	69,300	5,000	313,200	5,400	382,500
Wyoming	1,273	291,000	219	20,400	1,492	311,400	1,130	295,500	220	15,400	1,350	310,900
	41,497	11,628,900	41,335	2,818,600	82,832	14,447,500	44,470	12,538,000	45,700	3,204,300	90,170	15,742,300

[1] Compiled in the spring of 1924.

Capacity of storage for crude petroleum and refined products at refineries and at tank farms in United States in May, 1926, by types of storage

[Thousands of barrels of 42 U. S. gallons]

State	At refineries										Tank-farm storage for crude petroleum					Grand total
	For crude petroleum					For refined products [1]				Total						
	Steel	Wooden	Earthen	Concrete	Total	Steel	Wooden	Earthen	Concrete	Total		Steel	Wooden	Earthen	Concrete	Total	
Arizona	3				3	12				12	15						15
Arkansas	675		20		695	1,178				1,178	1,873	11,123	229	28,752		40,104	41,977
California	10,884	6		11,231	22,121	34,142	1	11	35,446	69,600	91,721	49,576	2	29,791	24,735	104,104	195,825
Colorado	120				120	341				341	461	41				41	502
Georgia	224				224	285				285	509						509
Illinois	1,681				1,681	7,264				7,264	8,945	13,620	4			13,624	22,569
Indiana	898				898	10,974				10,974	11,872	1,557	3			1,560	13,432
Iowa and Nebraska	33				33	42				42	75	621				621	696
Kansas	2,612	55			2,667	5,889	110			5,999	8,666	20,993	25			21,018	29,684
Kentucky	831				831	738				738	1,569	1,090	45		21	1,156	2,725
Louisiana	9,608	6	180		9,794	17,850			71	17,921	27,715	15,678	2,145	1,344		19,167	46,882
Maryland	1,572				1,572	2,039				2,039	3,611						3,611
Massachusetts	740			646	1,386	1,517			313	1,830	3,216						3,216
Missouri	180				180	2,048				2,048	2,228	1,558				1,558	3,786
Montana	102				102	273				273	375	1,469				1,469	1,844
New Jersey	7,668				7,668	23,700				23,700	31,368	1,835				1,835	33,203
New Mexico	27				27	86				86	113	344				344	457
New York	2,216				2,216	3,171				3,171	5,387	3,677	5			3,682	9,069
Ohio	1,068				1,068	3,084	14			3,098	4,166	14,353	61			14,414	18,580
Oklahoma	6,061	3		30	6,094	16,664			25	16,689	22,783	117,573	45			117,618	140,401
Pennsylvania	3,318	32			3,350	10,379			4	10,383	13,733	9,304	121			9,425	23,158
Rhode Island	1,036				1,036	2,195				2,195	3,231						3,231
South Carolina	651				651	806				806	1,457						1,457
Tennessee	2				2	150				150	152	1				1	153
Texas	15,687	118	1,060	1	16,866	44,013	96	1,913	3	46,025	62,891	88,443	285	17,427		106,155	169,046
Utah	336				336	586				586	922						922
Virginia	131				131	144				144	275						275
Washington	30				30	40				40	70						70
West Virginia	122				122	1,122				1,122	1,244	4,190	125			4,315	5,559
Wyoming	1,776		1	135	1,912	10,525		1		10,526	12,438	30,702				30,702	43,140
	70,292	220	1,261	12,043	83,816	201,257	221	1,925	35,862	239,265	323,081	387,748	3,095	77,314	24,756	492,913	815,994

[1] At refineries only, except in California.

Capacity of storage for crude petroleum and refined products in United States in May, 1926, by types of storage

[Thousands of barrels of 42 U. S. gallons]

State	Storage for crude petroleum					Storage for refined products [1]					Total				Grand total
	Steel	Wooden	Earthen	Concrete	Total	Steel	Wooden	Earthen	Concrete	Total	Steel	Wooden	Earthen	Concrete	
Arizona	3				3	12				12	15				15
Arkansas	11,798	229	28,772		40,799	1,178				1,178	12,976	229	28,772		41,977
California	60,460	8	29,791	35,966	126,225	34,142	1	11	35,446	69,600	94,602	9	29,802	71,412	195,825
Colorado	161				161	341				341	502				502
Georgia	224				224	285				285	509				509
Illinois	15,301	4			15,305	7,264				7,264	22,565	4			22,569
Indiana	2,455	3			2,458	10,974				10,974	13,429	3			13,432
Iowa and Nebraska	654				654	42				42	696				696
Kansas	23,605	80			23,685	5,889	110			5,999	29,494	190			29,684
Kentucky	1,921	45		21	1,987	738				738	2,659	45		21	2,725
Louisiana	25,286	2,151	1,524		28,961	17,850			71	17,921	43,136	2,151	1,524	71	46,882
Maryland	1,572				1,572	2,039				2,039	3,611				3,611
Massachusetts	740			646	1,386	1,517			313	1,830	2,257			959	3,216
Missouri	1,738				1,738	2,048				2,048	3,786				3,786
Montana	1,571				1,571	273				273	1,844				1,844
New Jersey	9,503				9,503	23,700				23,700	33,203				33,203
New Mexico	371				371	86				86	457				457
New York	5,893	5			5,898	3,171				3,171	9,064	5			9,069
Ohio	15,421	61			15,482	3,084	14			3,098	18,505	75			18,580
Oklahoma	123,634	48		30	123,712	16,664			25	16,689	140,298	48		55	140,401
Pennsylvania	12,622	153			12,775	10,379			4	10,383	23,001	153		4	23,158
Rhode Island	1,036				1,036	2,195				2,195	3,231				3,231
South Carolina	651				651	806				806	1,457				1,457
Tennessee	3				3	150				150	153				153
Texas	104,130	403	18,487	1	123,021	44,013	96	1,913	3	46,025	148,143	499	20,400	4	169,046
Utah	336				336	586				586	922				922
Virginia	131				131	144				144	275				275
Washington	30				30	40				40	70				70
West Virginia	4,312	125			4,437	1,122				1,122	5,434	125			5,559
Wyoming	32,478		1	135	32,614	10,525		1		10,526	43,003		2	135	43,140
	458,040	3,315	78,575	36,799	576,729	201,257	221	1,925	35,862	239,265	659,297	3,536	80,500	72,661	815,994

[1] At refineries only, except in California.

PRODUCTION OF PETROLEUM AND ROYALTIES FROM WELLS UNDER FEDERAL CONTROL

The following tables were compiled from data received by the United States Geological Survey and the Office of Indian Affairs.

The outstanding point of interest regarding operations on Government and Indian lands in 1926 was a small decrease both in production and royalties, although the total acreage of oil and gas land leased showed a material increase.

Crude petroleum produced on Government lands, 1925–26, under the operation of the leasing act of February 25, 1920

[From U. S. Geological Survey]

State and land office	1925			1926		
	Production (barrels)	Royalty		Production (barrels)	Royalty	
		Barrels	Value		Barrels	Value
California:						
Los Angeles	1,379,089.93	175,778.94	$231,235.01	1,765,545.69	253,008.85	$318,661.48
Visalia, outside naval reserves	4,962,696.06	670,292.67	814,054.19	4,810,175.23	681,014.33	639,617.50
Visalia, inside naval reserves	11,738,772.00	2,649,164.95	3,443,043.16	12,758,234.05	2,908,506.89	3,281,758.38
	18,080,557.99	3,495,236.56	4,488,332.36	19,333,954.97	3,842,530.07	4,240,037.36
Colorado: Glenwood Springs	556,825.82	31,326.21	40,156.61	781,276.60	39,651.95	66,012.72
Louisiana: Baton Rouge	2,064.87	258.12	511.79	3,455.08	431.88	1,001.06
Montana:						
Billings	1,282,056.78	89,805.42	230,655.92	852,794.69	50,269.99	138,073.76
Great Falls	425,173.62	28,444.46	44,893.97	858,025.50	39,081.55	45,058.22
Lewistown	352,266.63	20,388.23	48,232.34			
	2,059,497.03	138,638.11	323,782.23	1,710,820.19	89,351.54	183,131.98
New Mexico:						
Las Cruces	3,753.50	430.79	616.26	24,092.98	3,317.07	5,803.43
Santa Fe				928.54	185.72	556.31
	3,753.50	430.79	616.26	25,021.52	3,502.79	6,359.74
Oklahoma: Guthrie	10,828.32	1,448.01	3,315.91	280,501.49	47,905.29	121,992.41
Utah: Salt Lake City	2,496.41	499.29	499.29			
Wyoming:						
Buffalo	38,139.82	4,764.59	9,647.61	50,690.90	6,269.35	12,832.60
Cheyenne, outside naval reserves	13,373,292.13	2,263,891.96	4,288,307.44	16,712,168.07	2,654,766.52	5,713,495.03
Cheyenne, inside naval reserves	393,375.36	49,171.93	89,011.57	425,684.79	53,210.61	109,783.56
Douglas, outside naval reserves	6,327,903.79	1,174,106.44	2,103,266.33			
Douglas, inside naval reserves	239,326.30	29,915.79	50,222.83			
Evanston	10,742.00	1,123.76	1,954.80	77,339.13	4,374.76	4,491.14
Lander	360,304.56	47,793.00	83,044.15	436,917.17	57,809.18	78,074.07
Newcastle	58,620.25	7,316.20	12,833.29			
	20,801,704.21	3,578,083.67	6,638,288.02	17,702,800.06	2,776,430.42	5,918,676.40
	41,517,728.15	7,245,920.76	11,495,502.47	39,837,829.91	6,799,803.94	10,537,211.67

Royalty receipts from production of oil and gas and bonuses paid for sale of leases on Indian reservations, fiscal years ended June 30, 1925 and 1926

[From Office of Indian Affairs]

Reservation	1925			1926		
	Oil and gas land leased during year (acres)	Receipts		Oil and gas land leased during year (acres)	Receipts	
		Bonus from sale of leases	Royalty from production		Bonus from sale of leases	Royalty from production
Five Civilized Tribes:						
Oil	80,001	$247,260	$2,964,242	96,572	$195,785	$3,454,563
Gas			152,628			
Crow: Oil	1,100		12			
Kiowa:						
Oil	3,477	3,752	12,215	14,378	34,260	13,743
Gas			2,799			
Navajo (Pueblo Bonito): Oil	1,120	700		2,700	1,600	
Navajo (San Juan): Oil			50,371	18,160	62,400	102,900
Osage:						
Oil	20,175	[1] 14,577,607	9,793,073	45,874	[1] 10,603,688	10,349,829
Gas			1,351,510			
Pawnee:						
Oil	3,825	28,776	119,842	7,682	62,611	148,647
Gas			3,289			1,539
Ponca and Otoe:						
Oil	8,920	20,133	86,642	9,384	18,253	54,522
Gas			1,657			
Shawnee:						
Oil	15,457	49,060	6,994	4,666	48,526	138,846
Gas			600			
Shoshone: Oil	890	3,342	5,497	3,323	1,942	7,334
Ute: Oil	13,840	38,600		9,300	2,400	
	148,805	14,969,230	14,551,371	212,039	11,031,465	14,271,923

[1] Including deferred payments.

SUMMARY OF REFINERY STATISTICS

Refinery statistics, combined with statistics of crude petroleum, are issued monthly by the Bureau of Mines. No attempt is made here to present other than an abbreviated summary of the major refined products for the period 1922–1926. Detailed statistics of refined products for 1926 have been published by the bureau as Bulletin 289, Refinery Statistics, 1926.

Runs of domestic and foreign crude petroleum to stills in 1926 amounted to 734,301,000 and 44,963,000 barrels, respectively, a total of 779,264,000 barrels—an increase over 1925 of 39,344,000 barrels, or 5 per cent. The percentage yield of gasoline continued to increase steadily and for the year averaged 38.5 per cent, as compared with 35.1 per cent in 1925. The major part of the increase in recovery was due to cracking, which phase of refining produced a total of 93,736,000 barrels of gasoline in 1926 or the equivalent of 31.3 per cent of the total output. More and more gas oil and fuel oil are being diverted to cracking stock, which accounts for the greater part of the increase in gasoline recovery.

Production of gasoline for the year at refineries in the United States amounted to 299,734,000 barrels, an increase over 1925 of 40,133,000 barrels, or 15.5 per cent. Domestic demand for gasoline in 1926 amounted to 261,813,000 barrels, an increase over 1925 of 37,948,000 barrels, or 17 per cent. Domestic demand was greatest in August, the only month in which it exceeded production. October

daily demand was unusually high, even exceeding September, a result possibly of generally fair weather throughout the country. Stocks of gasoline on hand at the refineries on the first and last days of the year were 38,875,000 and 39,023,000 barrels, respectively, representing but a slight increase during the year as compared with an average annual increase of more than 20 per cent for the past nine years.

The output of kerosene in 1926 showed a small increase over the preceding year, but the domestic demand for this commodity showed a small decrease. Stocks increased during the year, nearly reaching the 1924 level.

In spite of the increased throughput, the production of gas oil and fuel oil in 1926 was but slightly larger than that of 1925, due to a decrease in percentage yield in favor of gasoline, as explained above.

There was a material gain in the production of wax in 1926 over 1925, but only a slight increase in total demand (domestic demand plus exports), with the result that stocks showed a material gain.

Refinery statistics, 1922–1926

[Thousands of barrels of 42 U. S. gallons except as otherwise indicated]

	1922	1923	1924	1925	1926
Crude oil run to stills:					
Domestic	425,823	538,252	597,954	698,582	734,301
Foreign	74,883	42,986	45,765	41,338	44,963
	500,706	581,238	643,719	739,920	779,264
Natural-gas gasoline run to stills or blended at refineries	3,662	5,487	12,671	[1] 19,636	[1] 27,696
Stocks of crude oil (domestic and foreign) at refineries at end of year	33,805	33,259	40,995	[2] 27,157 [3] 29,200	[2] 35,475
Gasoline:					
Produced	147,672	179,903	213,326	259,601	299,734
Imported	1,479	4,555	3,453	3,813	5,540
Exported [4]	14,156	20,741	28,967	31,497	43,313
Consumed	127,906	156,746	185,003	223,865	261,813
Stocks at refineries at end of year	21,043	28,014	30,823	38,875	39,023
Kerosene:					
Produced	54,913	55,927	60,026	59,689	61,768
Imported	[5] 3	7	10	19	74
Exported [4]	21,489	20,347	21,961	21,212	22,248
Consumed	34,854	35,048	36,712	39,969	38,140
Stocks at refineries at end of year	6,692	7,231	8,594	7,121	8,575
Gas and fuel oils:					
Produced	254,910	287,481	320,476	364,991	365,195
Imported	[5] 2,947	12,286	12,927	12,245	14,432
Exported [4]	18,479	33,372	37,249	36,088	38,351
Consumed	240,010	261,388	292,452	(6)	(6)
Stocks at refineries at end of year	31,065	36,072	[2] 19,556	[2] 24,681	[2] 24,898
Lubricants:					
Produced	23,304	26,128	27,498	31,055	32,293
Imported	[5] 43	29	11	37	33
Exported [4]	7,941	8,372	9,103	9,678	9,435
Consumed	15,528	17,260	18,124	20,581	22,568
Stocks at refineries at end of year	5,613	6,138	6,420	7,253	7,576
Wax (thousands of pounds):					
Produced	462,003	466,647	516,491	590,577	645,815
Stocks at refineries at end of year	204,891	164,758	89,706	116,391	185,331
Coke (thousands of short tons):					
Produced	707.1	672.5	761.1	991.0	995.3
Stocks at refineries at end of year	35.7	26.3	97.8	238.4	290.6
Asphalt (thousands of short tons):					
Produced [7]	1,895.3	2,327.1	2,545.6	2,677.4	2,922.8
Stocks at refineries at end of year	119.6	118.1	97.3	159.4	193.3
Losses [8]	18,562	18,921	19,590	22,914	26,928

[1] Includes natural-gas gasoline run through pipe lines in California.
[2] East of California.
[3] Includes 2,043,000 barrels in coastwise transit.
[4] Including shipments to Alaska, Hawaii, and Porto Rico.
[5] Sept. 22 to Dec. 31; figures not available prior to change in tariff.
[6] Figures not available.
[7] Figures for production of asphalt as given in the chapter on asphalt and related bitumens differ from the figures given here, mainly because of differences in classification of liquid products.
[8] Difference between total runs to stills and the volume of the classified products reported.

OIL SHALE AND SHALE OIL

The oil-shale industry in the United States was as quiescent in 1926 as in 1925. The entire production of shale oil was reported by two plants—that of the N-T-U Co., Santa Maria, Calif., and the Bureau of Mines experimental plant at Rulison, Colo. These two plants treated a total of approximately 5,000 short tons of shale, from which about 150,000 gallons of shale oil was extracted.

As noted in "Petroleum in 1925," the latter plant was in process of construction at the end of 1925. The record of events in 1926 has been published by the bureau in part, as follows:

> The work of completing the Scottish or Pumpherston retort was completed in the spring of 1926. The American type, or N-T-U retort, was completed in December, 1926, but made no runs until January, 1927.
>
> After preliminary heating, extending over a period of about three months, the first run on the Pumpherston retort was started on September 17, 1926. This retort was operated continuously from that date until midnight June 30, 1927, with the exception of a few weeks during the months of November and December, when difficulties were encountered in keeping the tramway in operation and for brief periods of a few hours each during the remainder of the time when it became necessary to shut down the retort due to difficulties encountered in handling coking shale. Considerable trouble was encountered in keeping the retorting plant in operation during the winter months of 1926–27, due to the fact that the worst weather that has occurred in the western slope of Colorado for the past several years was experienced.
>
> During 1926 a total of about 200 tons of shale was run through the retorts, yielding a total production of oil of about 80 barrels of 42 U. S. gallons, an average yield of nearly 17 gallons per ton. The shale charged to the retort had an oil content from practically nothing to as high as 75 gallons per ton on assay tests, although the highest average yield for a single day's operations was 42 gallons per ton. The oil shale used came from a quarry at the outcrop of the shale on the escarpment about 2,700 feet above the plant. A thickness of approximately 60 feet of the shale escarpment was mined, which included the so-called "mahogany" ledge.
>
> The oil produced by the Scottish retort had an average gravity of about 28° A. P. I. and yielded an average of about 25 per cent of gasoline and naphtha. The gasoline-naphtha fraction was deficient in low-boiling fractions, and it would be necessary to blend the product with more volatile material in order to produce a finished motor fuel. Experiments demonstrated that additional quantities of gasoline could be made from shale oil by cracking. Due to the high content of unsaturated hydrocarbons and nitrogen compounds, the distillates from shale oil are difficult to treat in order to produce commercial products. The work of refining shale oil is being continued at the Boulder laboratory in cooperation with the State of Colorado.

The above summarizes the operations at this plant for the year 1926. The discussion of the results of the tests with the N-T-U retort and the closing of the plant, due to lack of appropriations, will be discussed in "Petroleum in 1927."

World's production of oil shale, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country	1922	1923	1924	1925	1926
Australia:					
New South Wales	23,844	1,226	652		
Tasmania	41	1,119	1,601	833	2,161
Estonia	142,132	214,099	233,631	288,104	431,678
France [1]	61,018	62,142	70,968	(2)	(2)
Germany (Bavaria)	33	1,202	530	400	10
India, British				41	
Italy	5,476	5,662	2,987	2,700	10,200
Russia	18,500	24,200	(2)	(2)	(2)
Spain	(3)	(3)	(3)	(3)	(3)
Sweden	(4)	(4)	(4)	(4)	(4)
United Kingdom:					
England		71			
Scotland	2,645,790	2,906,475	2,902,960	2,504,390	1,991,250
United States	(2)	[5] 9,300	[5] 21,200	[6]	5,500

[1] Includes some boghead coal.
[2] Data not available.
[3] There is in operation in Puertollano a plant for the treatment of oil shale and impure coal to obtain oil, but no details of production are available.
[4] Data on production of oil shale not available; the following quantities of shale oil were extracted from alum shale: 1922, 353 tons; 1923, 158 tons; 1924, none; 1925, 12 tons; 1926, 51 tons.
[5] Estimated. Used in production of shale oil.
[6] Produced by one company; figures confidential and can not be disclosed.

PROPERTIES OF CRUDE OILS FROM VARIOUS FIELDS OF THE UNITED STATES

The following table is a continuation of the summary of analyses of typical crude oils published in "Petroleum in 1925." It covers a number of recent laboratory tests on crudes, most of which were obtained from recently discovered fields.

Properties of typical crude oils from fields of the United States

Sample No.	State	County	Field or district	Sand or depth	Properties of crude					Gasoline fraction		Kerosene fraction		Viscosity at 100° F. of vacuum fractions			Carbon residue, per cent
					Specific gravity	Degrees A. P. I.	Sulphur content	Viscosity at 100° F.	Pour test ° F.	Per cent	Degrees A. P. I.	Per cent	Degrees A. P. I.	225–250° C.	250–275° C.	275–300° C.	
24602	California	Kern	Devil's Den	180–360 feet	0.981	12.7	0.57	4,400	55					98	238		11.8
26329	do	Los Angeles	Inglewood		.944	18.4	2.60	600	(1)	10.0	47.2			72	150	[2] 48	15.4
26332	do	do	Rosecrans	Upper Athens	.843	36.4	.57	40	(1)	38.8	51.3	6.6	40.6	58	91	195	10.0
23418	do	Orange	Newport Beach		.984	12.3	1.99							129	(3)	[2] 57	20.0
26328	do	do	Seal Beach		.909	24.2	1.23	159	15	16.0	51.3	4.6	40.9	63	105	200	14.3
24316	do	San Mateo	Half Moon Bay	750 feet	.805	44.3	.19	32	(1)	60.4	56.9	6.1	41.7	70	126	(3)	9.5
26202	do	Sonoma	Petaluma	965–993 feet	.936	19.7	.63	223	(1)	2.1	45.8			79	157	406	14.0
26336	do	Ventura	Ventura Ave	Deep	.875	30.2	1.17	64	20	26.6	56.7	4.2	41.5	69	105	150	12.7
27343	Oklahoma	Seminole	Bowlegs	Wilcox, 4,111–4,134 feet	.821	40.9	.30	38	(1)	39.1	62.9	9.5	41.9	60	93	175	6.8
27379	do	do	Earlsboro	Earlsboro, 3,417–3,460 feet.	.824	40.2	.25	42	(1)	37.9	62.6	10.1	42.8	61	95	185	5.4
27381	do	do	Searight	Hunton, 4,055–4,155 feet.	.834	38.2	.24	41	(1)	36.0	59.5	10.4	41.9	61	93	185	6.0
27335	do	do	Seminole	Wilcox, 4,136–4,138 feet	.827	39.6	.33	39	(1)	38.6	61.0	4.9	43.2	61	91	165	7.3
4	Texas	Hutchinson	Panhandle	Lime, 3,071–3,076 feet	.846	35.8	.62	58	55	22.3	57.4	17.1	43.0	54	75	[2] 42	5.3
26596	do	Jefferson	Spindletop	5,003 feet	.878	29.7	.14	51	(1)	15.7	46.7			80	145	395	2.6
26587	do	do	do	3,377 feet	.901	25.6	.30	63	(1)	4.6	49.0			96	215	(3)	2.8
26586	do	Limestone	Nigger Creek	Woodbine, 2,840–2,842 feet.	.825	40.0	.27	42	(1)	36.9	62.9	11.5	44.5	65	97	193	8.6
5	do	Reagan	Big Lake	2,438–2,440 feet	.855	34.0	.30	48	(1)	29.8	55.9	5.1	42.1	63	100	180	5.9

[1] Below 5° F.

[2] Viscosity at 212° F.

[3] More than 400 seconds Saybolt Universal at 100° F.

COAL

By F. G. Tryon, O. E. Kiessling, and L. Mann[1]

ACKNOWLEDGMENTS

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[1] The work incident to the preparation of coal statistics was done by the following employees of the Bureau of Mines: Compilation of the annual statistics of bituminous coal was conducted by L. Mann, with the assistance of J. M. Corse; the statistics of anthracite were compiled by H. L. Bennit; the monthly and weekly estimates of production were prepared by R. McKinney; the distribution tables, by G. S. Goodman; the figures of consumers' stocks were compiled by H. O. Rogers, who also conducted the study of consumer-owned mines; the data on world production were assembled by L. M. Jones; and the tables of exports and imports were compiled from the records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey. O. E. Kiessling wrote the bituminous market and foreign-trade review and collaborated with F. G. Tryon in writing the other sections of the report. The anthracite section of the report was printed in advance of the report as a whole and distributed in January, 1928, under the title "Anthracite in 1926, by F. G. Tryon and H. L. Bennit."

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REVIEW OF THE COAL INDUSTRY IN 1926

BITUMINOUS COAL

In the bituminous coal industry 1926 was a period of large production, and the depression felt since 1924 was temporarily less acute. During the year four major short-time influences dominated the soft-coal market—a need for household fuel in place of anthracite during the first quarter, a large total consumption which reflected record industrial activity, a windfall export trade on the wake of a seven-month strike in the United Kingdom, and in the closing months of the year purchases for storage against the anticipated suspension in the union bituminous fields on April 1, 1927. The chance combination of these transient conditions created a situation in the bituminous coal industry that overshadowed for the time being the effect of important long-time trends—the pressure of surplus capacity and arrested growth of demand—in forcing readjustment and liquidation. Again, as in 1923, conditions that buoyed production to a relatively high level and brought a flurry in spot prices obscured the causes of instability latent in the industry. At the end of 1926, however, the anthracite fields were in full operation under a five-year contract,

exports were declining and promised to slump further, and business barometers were forecasting declines in general business for 1927. While the outlook to April 1, 1927, was promising from the standpoint of production, signs were pointing toward a reassertion in 1927 of the depression which in 1924 and 1925 had left in its wake declining prices, narrow profits or absolute losses, abandoned mines, and unemployment.

From the standpoint of volume the bituminous coal trade of 1926 was encouraging. The production of 573,367,000 tons—although far below what might have been expected had the pre-war growth of demand continued—showed an increase of 8,802,000 tons above 1923, the last "good" year. Indeed, it came within 1 per cent of the record of 579,386,000 tons established in 1918. The weekly production in 1926 ranged from a low point of 8,235,000 tons in the week ended July 10 to a maximum of 14,551,000 tons in the week of December 4. The latter figure was a million tons above any weekly output made in previous years; five times in six weeks, from November 13 to December 18, production exceeded the old record of 13,344,000 tons, attained just before the general strike of 1919. (Table 15 and fig. 1.) Production for November, 1926, was 59,213,000 tons, a gain of 2,013,000 tons over the previous monthly record, set in October, 1919. Tidewater shipments in 1926 reached a new peak, and dumpings at Lake Erie had been exceeded but once in the history of the Lake cargo trade.

Effect of the anthracite suspension.—The year opened with the anthracite suspension, which was already 4 months old, still in effect. It continued for another 39 working days; and between January 1 and the return of normal conditions in the anthracite market some 12,000,000 tons of bituminous coal were employed to replace anthracite, either indirectly in the form of coke or directly as raw coal. The chief beneficiaries in the bituminous coal trade were the "smokeless" fields in southern West Virginia and central Pennsylvania and those producers of high-volatile lump coal who were near enough to the anthracite region to participate in the demand. Thus, the spot price of West Virginia smokeless run-of-mine per net ton f. o. b. mines, as quoted by Coal Age in the Boston market, had jumped from $1.58 in July, 1925, to $2.29 in December of the same year. A recession in January, 1926, to $2.07 was followed by an advance to $2.12 in February; but the stimulus of the anthracite shortage ended in the latter part of February. Prices of bituminous coal slumped during the severe reaction following the resumption of work in the anthracite region, and comparable quotations on Pocahontas run-of-mine in the Boston market were $1.68 in March and $1.51 in April. In this period thousands of cars of bituminous coal which had been rushed forward to eastern markets for sale as domestic fuel were sold at a sacrifice, as shippers struggled amid cancellations and rejections to rid themselves of large lots in transit. The anthracite strike was scarcely felt outside of the few districts of the East, however, and for the country as a whole Coal Age's average spot prices for January and February were only 8 and 5 cents a ton higher, respectively, than for the same months of 1925. (Table 52.)

Industrial consumption high in 1926.—The consumption of bituminous coal for all purposes in 1926, excluding exports and additions to stocks, was 532,581,000 net tons. In a later section of this

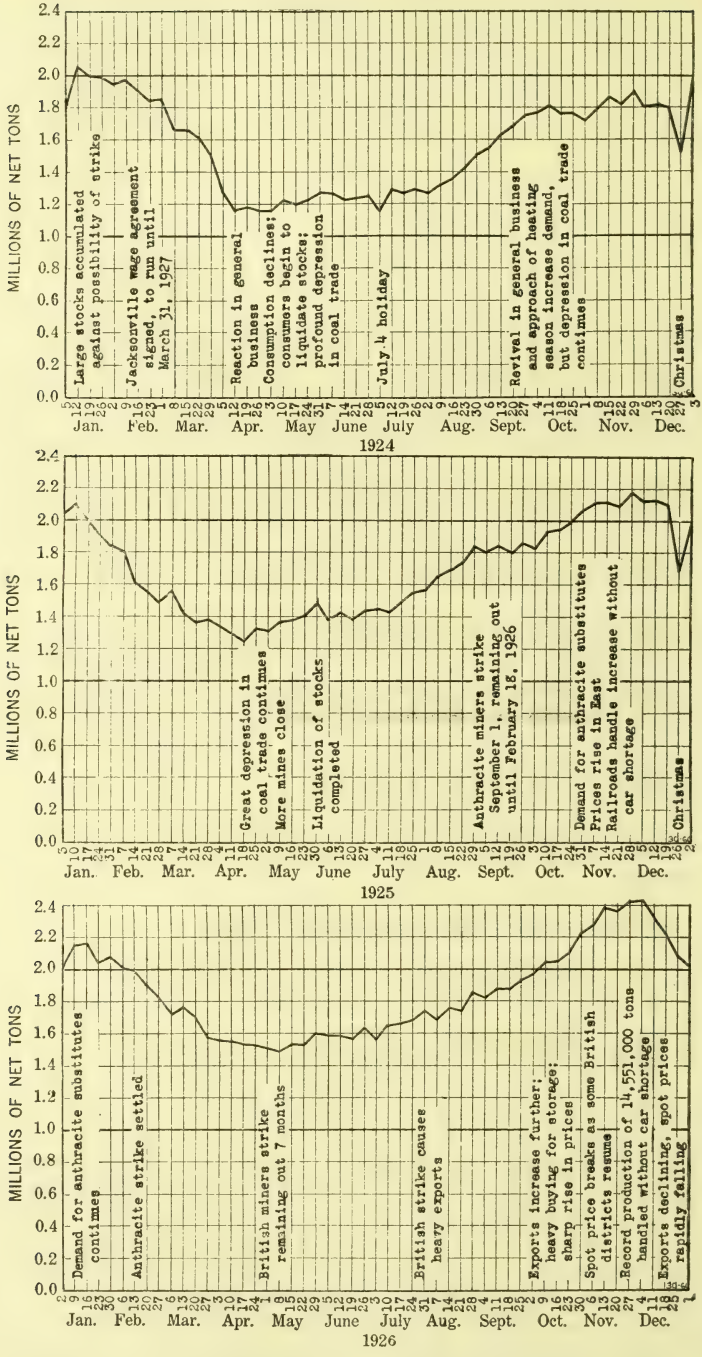
MILLIONS OF NET TONS
Large stocks accumulated against possibility of strike
Jacksonville wage agreement signed, to run until March 31, 1927
Reaction in general business
Consumption declines; consumers begin to liquidate stocks; profound depression in coal trade
July 4 holiday
Revival in general business and approach of heating season increase demand, but depression in coal trade continues
Christmas
1924
Great depression in coal trade continues
More mines close
Liquidation of stocks completed
Anthracite miners strike September 1, remaining out until February 18, 1926
Demand for anthracite substitutes
Prices rise in East
Railroads handle increase without car shortage
Christmas
1925
Demand for anthracite substitutes continues
Anthracite strike settled
British miners strike remaining out 7 months
British strike causes heavy exports
Exports increase further; heavy buying for storage; sharp rise in prices
Spot price breaks as some British districts resume
Record production of 14,551,000 tons handled without car shortage
Exports declining, spot prices rapidly falling
1926
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

FIGURE 1.—Average production of bituminous coal per working day for each week, 1924–1926

report it is shown that fuel economy and competition of oil and water power have checked the former growth of demand, so that the consumption of all coal in 1926 was some 145,000,000 tons less than might have been expected had the pre-war rate of increase continued. In comparison with its immediate predecessors, however, 1926 was a year of large consumption. (Fig. 2.) Even after deduction of the 12,000,000 tons used to replace anthracite the quantity of bituminous coal consumed increased 36,577,000 tons over 1924 and 1,588,000 tons over the active year 1923. An industrial boom,

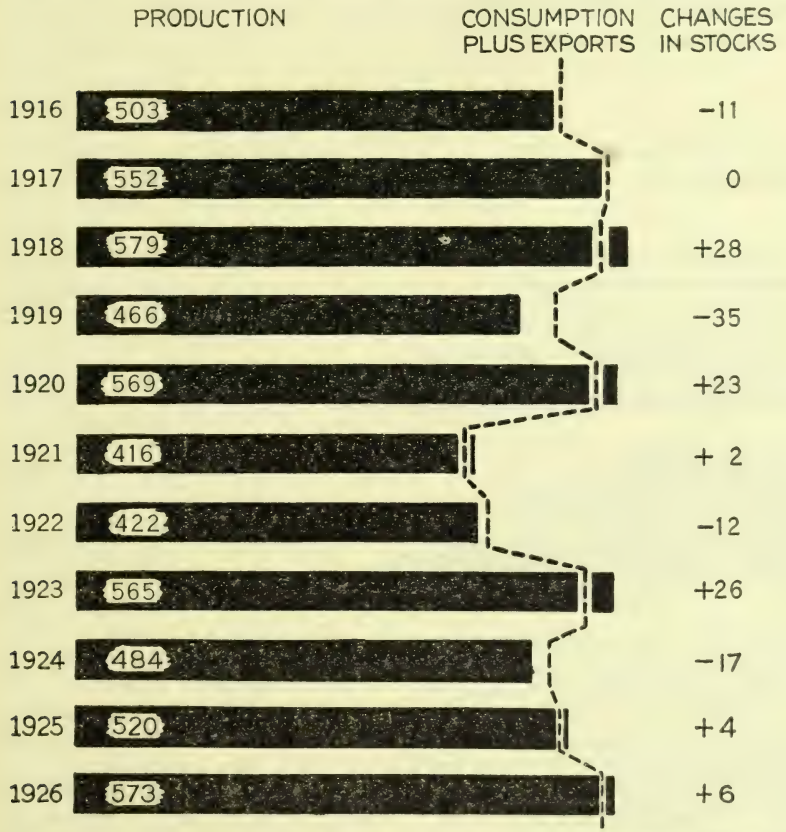

FIGURE 2.—Production of bituminous coal compared to consumption and exports. Figures represent million tons

reflected in the upward trends of business barometers and characterized by a high constant volume of output through the year in most lines of business, was marked by a commensurate use of fuel in the manufacturing, transportation, raw materials, and other industries. It is clear that even when allowance is made for the use of bituminous coal to replace anthracite the demand of home industries for coal was unusually strong and steady throughout the year.

Expansion of sea-borne exports.—With domestic industry moving at high speed, added impetus was given the bituminous coal trade by an accelerated demand for coal to be exported. Exports to

Canada continued with characteristic stability and sea-borne shipments showed a tremendous increase; throughout the last half of the year a great off-shore demand was one of the dominating influences in the coal market. The foreign demand was unusually intense because of the seven months' suspension of production in Great Britain. The general walkout of the British miners on May 1 immediately started discussion of exports from this country. In May sea-borne shipments increased approximately 28 per cent over the April figure, the June total was about twice as large as that of May, and July more than doubled the June total. There was a continuous increase each month, until a record of 3,722,095 net tons was reached in November. For the year the total sea-borne exports of bituminous coal reached 21,510,000 net tons, an increase of approximately 450 per cent over 1925 and a quantity only slightly under the record set in 1920.

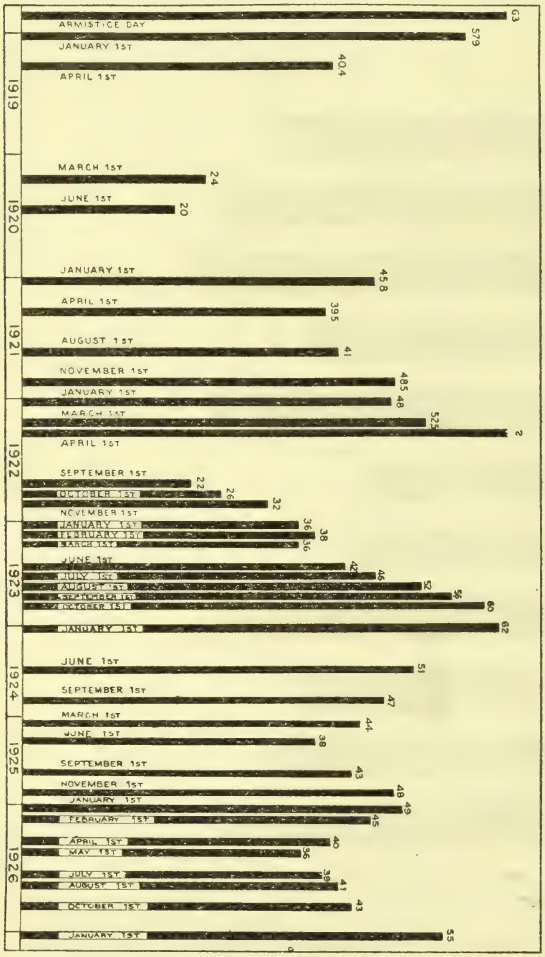

FIGURE 3.—Total commercial stocks of bituminous coal. Figures represent million tons

The chief beneficiaries of the large increase in sea-borne exports were the eastern bituminous coal fields, particularly those of Pennsylvania and West Virginia. The fields of the interior, though unable to participate directly in the export boom, experienced some relief from the competitive pressure of the eastern shippers, particularly during the last quarter of the year. Some stimulation was felt in Alabama in the late fall, when congestion and delay in loading export coal at the eastern ports caused diversion of foreign vessels to Pensacola for cargoes, and 250,000 tons of export fuel for delivery through November and December were reported ordered in this market.[2]

[2] Coal Age, vol. 31, No. 4, Jan. 27, 1927, p. 169. According to the records of the Bureau of Foreign and Domestic Commerce, the actual exports from Pensacola during November and December were only about one-fifth of this amount.

A gain of approximately 14,000,000 net tons in shipments to Europe represented the greater part of the growth in the sea-borne trade in 1926. This coal displaced former British tonnage in the main and went chiefly to the United Kingdom, Irish Free State, Italy, and France. Exports to South America tripled those for 1925 and were 1,500,000 net tons in excess of the 1924 figure. The chief purchasers in the South American market were Argentina, Brazil, and Uruguay. Although shipments of bituminous coal to Africa, Asia, and Oceania in 1926 were unimpressive in terms of total quantities they represented large proportional increases over the previous years.

Increase in stocks during 1926.—Besides the use of some 12,000,000 tons of soft coal to replace anthracite, a high rate of domestic consumption, and the extraordinary exports, a fourth factor in the demand of 1926 was an increase in the quantity in storage. In Figure 3 it is seen that commercial stocks of coal—49,000,000 net tons at the beginning of the year—were reduced to 36,000,000 tons by May 1 and slowly increased to 55,000,000 tons at the end of the year. In comparison with the amount in storage at the end of 1925 there was a net gain of 6,000,000 at the end of 1926. (Fig. 2.) The purchase of large tonnages for storage during the last half of the year was inspired in part by a fear that the extraordinary export demand would carry prices still higher and in part by apprehension felt concerning supply after the expiration of the Jacksonville agreement on April 1, 1927.

Prices in 1926.—After declining during the first half of the year spot prices moved sharply upward from August through November. (Fig. 4.) Following some recession in demand after the settlement of the anthracite strike, Coal Age's weighted average spot price of 14 coals f. o. b. mine slumped from $2.18 for January to $2.01 for March. The same indicator was around $1.91 from April through July. Despite some tendency to restrict production on account of relatively weak prices, shipments under contract continued in heavy volume, but the low open-market prices left little room for profit on spot sales. By the end of July there was evidence that the summer dullness would be short-lived. Exports had increased noticeably over June, and coal-consuming industries showed no lessening of activity during the early summer.[3] The Lake trade, which was late in getting under way, surpassed that of either 1924 or 1925 in volume. The outlook for fall business was encouraging. After August 1 the upward course of spot prices reflected the influence of the rapidly increasing exports. Coal Age's weighted average increased to $2.15 in September, $2.70 in October, and $3.19 in November. This ascent in the general average spot price for the country, however, does not adequately indicate the accentuated rises occurring in the eastern market as compared with the more sluggish price changes in other areas. Spot prices of southern West Virginia smokeless run-of-mine on the Boston market, as quoted by Coal Age, climbed from $1.69 in June to $5.29 in November, whereas the spot price of southern Illinois run-of-mine on the Chicago market increased from $2.38 in July to $2.77 in November. During October and November prices

[3] Federal Reserve Bulletin, vol. 13, No. 2, February, 1927, p. 77.

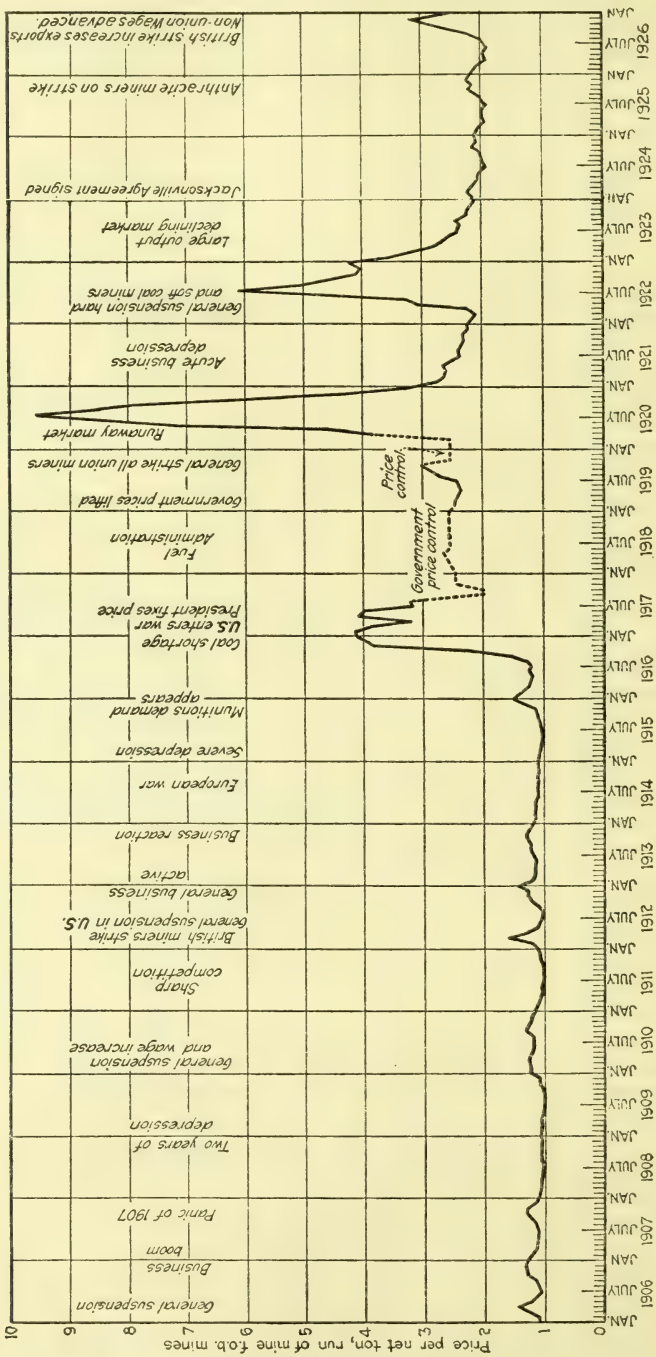

FIGURE 4.—Monthly average spot prices of bituminous coal f. o. b. mines, as quoted by Coal Age, 1906–1926

at tidewater soared and at one time reached $9.40 f. o. b. piers [4] at Hampton Roads.

The boom, however, did not last. Reports of the impending end of the British strike took sharp toll of spot prices, which declined from a maximum of $3.61 on November 8 to $3.32 on November 15. Along the Atlantic seaboard and over the Appalachian region prices fluctuated in sympathy with the British situation. When news did arrive of the collapse on November 19 of organized opposition to the British settlement, the downward trend was suddenly and severely accelerated, and the spot price of $2.94 on November 22 represented a drop of 67 cents in 2 weeks.[5] From then on the story of prices was an unrelieved tale of falling quotations from which no producing district escaped. The decline was steady throughout December following the resumption of mining in all of the important British districts, and the average for the last week of the year was $2.40, compared with $2.16 in 1925 and $2.06 in 1924.[6]

The sharpness of the price flurry of 1926 surprised many seasoned observers in the coal trade. That prices should jump so suddenly at a time when the existence of surplus capacity was well known, when no extensive strike was in progress, when the railroads were giving perfect service, and when consumers' stocks seemed fully up to normal puzzled many who had studied the behavior of the market in previous years. Former experience had indicated that stocks of 39,000,000 tons, such as were on hand July 1, were sufficient to quiet the market; and stocks of 43,000,000, such as existed on October 1, had previously been associated with a buyers' market.[7]

In partial explanation of the condition it should be noted that the stocks were not evenly distributed. Although some parts of the country were carrying larger reserves than in the year before, the industrial Northeast was carrying less,[8] and it is clear that within this area, as always, there were many individual consumers who had little or no coal on hand. Moreover, at this time consumers were beginning to consider their stocks not in the light of an uninterrupted supply but with regard to a suspension of mining when the wage agreement should expire, a contingency which the existing reserves of 40,000,000 tons or more would hardly be sufficient to tide over.

It should also be noted that the demand for overseas export—clearly the exciting cause of the rise in price—piled up on the fields of the middle Appalachians at the time they were already shipping heavily to the Great Lakes. This situation in itself was enough to initiate an advance in prices; and once such an advance was under way many consumers, uncertain how long the British strike would last and desiring to lay in a reserve before April 1, 1927, hastened to buy because they feared prices would rise. Purchasing agents, buying for storage, found themselves bidding against Lake and export interests for the available tonnage.

Even when allowance is made for these causes the influences shaping the price appear to be as much psychological as real. Buyers

[4] Price per net ton based on quotation of $10.50 per gross ton on smokeless run of mine. Coal Age, vol. 30, No. 20, Nov. 11, 1926, p. 686.
[5] Coal Age, vol. 30, No. 22, Nov. 25, 1926, p. 759.
[6] Coal Age, vol. 30, No. 27, Dec. 30, 1926, p. 929.
[7] Wing, D. L., and Tryon, F. G., "Fluctuations in coal production"; The Problem of Business Forecasting: Boston, Mass., 1924, p. 206.
[8] Bureau of Mines—Bureau of the Census, Report on Commercial Stocks of Coal, Oct. 1, 1926.

who remembered the crises of 1917, 1920, and 1922 allowed themselves to be influenced by the "atmosphere of the market." However, the adequacy of supplies was soon apparent. A flood of coal deluged the market. In one week the mines proved their ability to produce and the railroads to transport the record output of 14,551,000 tons. A few weeks of production at a rate indicating that coal must be pouring into storage allayed apprehension, and when cable messages on November 20 reported virtual termination of the British strike in the important districts the price broke suddenly from $3.32 to $2.94,[9] and the flurry of 1926 was over.

The trend of spot prices alone, however, gives an exaggerated impression of the level of sales realizations in 1926. Even during the period of active demand for export much of the output moved at contract prices far below the open-market quotations.[10] A few of the districts most affected by the export demand obtained materially higher realizations than in 1925. In Kanawha County, W. Va., typical of the southern high-volatile fields, the average realization advanced from $1.57 in 1925 to $1.72 in 1926, an increase of 15 cents. In McDowell County, typical of the low-volatile fields, it increased from $1.93 to $2.09, or 16 cents. These advances in the more fortunate districts, however, were largely offset by decreases in other fields. For the industry, as a whole, the average sales realization on all coal produced in 1926 was $2.06, just 2 cents higher than in 1925 and 62 cents lower than in 1923. (Table 49.)

Increase of nonunion wage rates in late 1926.—In connection with the rise of spot prices late in 1926 it is essential to note that not all of the increase in price went to increase the margin of the operator. Beginning in October, wages were advanced in most of the nonunion fields of the East, and production costs increased accordingly. Nonunion wage rates, which had been on a parity with union rates for some time after the strike of 1922, had been reduced to the 1917 level or even lower since the Jacksonville agreement was signed. Against a standard day wage of $7.50 at the union mines, nonunion operators were paying nearer $5 [11] during the first seven months of 1926, with corresponding differences in tonnage rates.

The market conditions caused by the British strike, however, precipitated a temporary increase in the nonunion rates. The movement began in Pennsylvania and Ohio following the reopening of a number of union mines which had been closed before, but which now at the higher prices resumed production at the Jacksonville scale. Adjacent open-shop operations soon found themselves forced to raise wages, and one large company in the Pittsburgh district which had been operating open shop since August, 1925, even posted an advance of 5 per cent above the Jacksonville rate (October 27). From Pennsylvania the movement spread to competitive fields, and within a fortnight wage advances had been posted at many operations in West Virginia, Kentucky, Tennessee, and Virginia.

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[9] Coal Age, vol. 30, No. 22, Nov. 25, 1926, p. 759.

[10] Accurate information is not available as to the relative proportions of spot and contract sales. A study by the United States Coal Commission showed that in 1920 and 1921 about 71 per cent of the commercial shipments (excluding deliveries by consumer-owned mines) were made on contracts for six months or more and 29 per cent on spot sales or short-term agreements. See United States Coal Commission Report, p. 1795.

[11] There was the widest variation in rates in the nonunion fields, and accurate and complete information does not exist as to the wages actually paid. It is known, however, that many nonunion mines were paying approximately $4 or $5 for inside day labor. Bureau of Labor Statistics Bull. 454. Hours and Earnings in Bituminous Coal Mining, 1922, 1924, and 1926.

The change brought a measure of relief to the northern fields. Overnight the mines which had gone nonunion in portions of the central competitive field were restored to the Jacksonville rate; the competitive pressure of the southern fields became less severe, and a considerable number of union mines which had been closed were now enabled to resume production. The relief, however, was destined to be short-lived. Although there was no general downward sweep of wages before the end of the year, the decline of selling prices had already begun to precipitate wage reductions in the Cumberland-Piedmont, Somerset, Cambria, and Freeport districts, and at some operations in West Virginia and Kentucky. How general would be these reductions the developments of 1927 were to show.

Adequate transportation.—Practically no transportation difficulties occurred in 1926 to quicken buying interest. Railroad service was satisfactory throughout the year, and there were only a few local instances of congestion or accumulation and an almost complete absence of car shortage. Where in the past complaints over the car supply were heard whenever production reached 10,000,000 tons a week, toward the close of 1926 the railroads handled without difficulty a weekly output of over 13,000,000 tons for eight weeks. (Table 15.) Their achievement was the more remarkable because there was maximum traffic in other commodities as well as in coal. Weekly car loadings reached new peaks in 1926, and the highest previous monthly and yearly totals were also surpassed.[12] In fact, the previous high level of loadings for a single week, which had been reached in 1925, was exceeded in 10 different weeks during the year 1926. In net ton-miles, 1926 also broke all previous records, and the gain over 1925 was 7 per cent. This test of the transportation system in 1926, when coal shipments constituted 18.62 per cent of the commodity car loadings,[13] as compared with 17.39 per cent in 1925 and 17.59 per cent in 1924, dispelled with finality any doubts still remaining as to the adequacy of railway service to the coal industry for the immediate future at least.

Business continued to shift southward.—The diversion of business from North to South continued, despite the relative activity of union States during the last part of 1926. Between 1923 and 1926 the production of Ohio decreased 31 per cent, of Indiana 12 per cent, and of Illinois 13 per cent. The production of West Virginia, on the contrary, increased 33 per cent, of Kentucky 41 per cent, and of Virginia 20 per cent. (Fig. 11.) The four largest coal-producing States of the South established new records of output in 1926. Kentucky produced twice as much as Ohio, below which it had ranked in 1921. Pennsylvania led West Virginia by 64,000,000 tons in 1923; in 1926 Pennsylvania was still ahead, but by less than 10,000,000 tons. From 1925 to 1926 there was some recovery of business by the Northern States.[14] Illinois produced 4 per cent more than in 1925, Indiana 9 per cent more, and Pennsylvania 12 per cent more. In contrast, the principal Southern States made greater proportional gains: Kentucky 14 per cent and West Virginia 17 per cent. (Table 13.) The trend over the four years, 1923 to

[12] Parmelee, J. H., A Review of Railway Operations in 1926: Bureau of Railway Economics, Miscellaneous Series No. 42, 1927, p. 8.
[13] Same as footnote 12.
[14] The tonnage produced in Ohio, however, continued to decline from 1925 to 1926.

1926, shows that the southern fields have made severe inroads into the markets of their northern competitors. The short-time comparison, 1925 with 1926, shows that in 1926 they secured the greater proportion of the increase over 1925.

Continued movement toward concentration of work in the larger mines.—In addition to adjustment between producing regions, other tendencies were operating within the fields themselves. In both northern and southern States a larger proportion of the output than ever before came from the big mines. (Fig. 14.) In the United States, as a whole, 58.1 per cent of the production of 1926 was contributed by class 1 mines, as against 47.2 per cent in 1923 and 53.7 per cent in 1925. Class 1 mines are those producing 200,000 tons or more. (Table 45.) In West Virginia the tonnage of the class 1 mines increased from 34.5 per cent in 1923 to 57.9 per cent in 1926; in Kentucky it increased from 25.8 per cent in 1923 to 49 per cent in 1926; in Pennsylvania it increased from 53.9 to 60.2 per cent; and in Illinois from 74.8 to 83.8 per cent. Changing conditions in both union and nonunion districts have, therefore, tended to eliminate smaller mines and to concentrate available business among the larger enterprises.

Steadier working time.—The reduction in number of mines has afforded steadier operation to those fortunate enough to survive. The average time worked by the 9,331 commercial mines in operation during 1923 was 179 days. The average time worked by the 7,177 mines in operation during 1926 was 215 days. From 1923 to 1926 there was thus an increase in average working time of 36 days, or 20 per cent, and as the increase in production during the same period was only 1.6 per cent the improvement in average working time appears to be due almost entirely to the change in number of mines.

Even in States where production declined the average number of days worked by the mines surviving in 1926 was often greater than the average for 1923. Thus, in Illinois the average increased from 158 days in 1923 to 172 in 1926; in Indiana it increased from 136 days to 173; in Pennsylvania, from 213 days to 224. In States where production was growing the increase in working time was naturally greater still. Thus, in Kentucky the average number of days worked rose from 152 days in 1923 to 230 days in 1926, and in West Virginia from 169 days to 247. This improvement at the mines that managed to stay in operation serves to emphasize the plight of those that were forced to close.

The year 1926 also shows an increase in working time over 1925, caused not by changes in the number of mines but by the increase in production already cited. For the industry, as a whole, the average working time increased 20 days. In Pennsylvania the increase was 24 days; in Illinois and Indiana, 11 and 14 days, respectively; in West Virginia, 22 days; and in Kentucky the average working time increased 24 days. Both North and South showed an improvement over the previous year.

General decline in the number of workers.—Steadier working time and a smaller number of large mines made possible the maintenance of production with a smaller number of workers. Between 1923 and 1926, 111,146 men, or approximately 16 per cent of the working force, lost their jobs in the soft-coal fields. It is seen in Figure 12

that the decline in the number of men employed, although varying sharply in degree among different States, is a general phenomenon throughout the bituminous coal industry. In all but one of the 24 principal producing States the number of men employed in 1926 was less than in 1923. In spite of steadily increasing production in the area east of the Mississippi and south of the Ohio and the Potomac, 5,149 less miners were at work in 1926 than in 1923. In the remaining States east of the Mississippi the reduction in number of employees was accentuated by the shift of business from North to South. In the States north of the Ohio and the Potomac and extending from Illinois through Pennsylvania 91,286 less men were employed in 1926 than in 1923. West of the Mississippi the loss in number of employees over the same period was 14,625.[15] Variation in the rate of decrease in men employed among different States is due, first, to the competitive environment in which they find themselves, and, second, to the adjustments taking place within their boundaries.

Increasing annual output per worker.—With a smaller number of workers producing more coal, the annual output per worker has increased. For the combined bituminous coal fields it increased from 801 tons per man to 966 tons, or 20.6 per cent, between 1923 and 1926. In West Virginia the increase from 1923 to 1926 was 31.6 per cent; in Kentucky, 41.4 per cent; in Illinois, 15 per cent; in Indiana, 34.3 per cent; and in Pennsylvania, 11.2 per cent. The annual output per worker in 1926 exceeded by 2.5 per cent the previous record of 942 tons reached in 1918.

ANTHRACITE

In spite of the suspension of mining in the first six weeks of the year, the production of anthracite in 1926 nearly equaled the average of other recent years. The total output was 75,390,582 gross tons, a decrease of 3,115,545 tons when compared with 1924 and an increase of more than 20,000,000 tons over 1925, the first year affected by the great suspension. In comparison with the average for the 10 years just preceding 1925, which amounted to 78,500,000 gross tons, the production of 1926 shows a decrease of only 4 per cent.

The suspension and its aftereffects were the dominant influences shaping the market of 1926. The strike had begun with the expiration of the wage agreement on September 1 of the previous year. The last four months of 1925 had been marked by gradual exhaustion of stocks and by increases in the price of competitive fuels and of such independent anthracite as was still available. As the suspension continued the reserves of the domestic sizes in the storage yards of the producers were shipped away. Supplies of anthracite in the yards of representative retail dealers, sufficient for 53 days on September 1, were severely depleted by December 31.

Such was the condition at the beginning of 1926. For some weeks the deadlock between the miners and operators continued unbroken. So successful had been the movement to find substitutes for anthracite that the demand for intervention by the Federal Government,

[15] The data on men employed which are used in this paragraph exclude figures for Alaska, Arizona, California, Georgia, Idaho, North Carolina, Oregon, and South Dakota.

which had been a conspicuous feature of earlier strikes, was less noticeable in 1925–26. The railroads handled without serious difficulty the task of bringing in coke and soft coal from a distance; in fact, during January and February the prices of bituminous coal f. o. b. mines declined. Efforts at mediation were made by the Governor of Pennsylvania and by local interests in the anthracite region, but the final settlement was reached by the two parties themselves without pressure from outside authority. On February 12 a new agreement was signed to run until August 31, 1930, a period of five years. The agreement continued the wages and working conditions existing before the suspension, but provided that at any time after January 1, 1927, either party might propose modifications in the wage scale. Means for considering such proposals were also specified.

The suspension lasted 170 calendar days and was the longest in the history of the anthracite region. The number of mine working days lost was 140. All employees except the maintenance crews and the workers on river dredges were affected, the total number of men on strike being 145,000. The number of man-days workers were idle on account of strikes was 15,269,506 in 1925 and 5,990,477 in 1926, a total of more than 21,000,000 man days, practically all of which was associated with the great suspension. (See Table 22A.)

The new contract, which had been signed by the negotiators on February 12, was formally ratified by tridistrict convention of the miners on February 16. Work was resumed on February 18, and 24 hours later the first shipments reached New York tidewater. Production recovered promptly; within a month the weekly output had reached 1,953,000 net tons, and the March production was the largest in any March since 1923. Even after the end of the heating season the demand for the domestic sizes continued active, as consumers and retailers bought to rebuild their depleted stocks. Production in June, for example, was 8,878,000 net tons, the largest in any June since 1917. At this rate the deficit in stocks was soon made up. The reserves in retail yards, which had dwindled to the vanishing point at the end of the strike, were sufficient on October 1 to last 46 days. By December 31 the stocks in retail yards were fully up to normal, and all outward traces of the great suspension had disappeared.

Production in 1926 would have been even larger had it not been for extraordinary rains which resulted in the flooding of many mines early in November.

The course of anthracite prices in 1926 reflected the influence of the suspension. The large companies adhered scrupulously to their circular prices in spite of the insistent demand, a practice to which the United States Coal Commission had paid public tribute in the shortage of 1922–23.[16] When mining was resumed independent coals of the domestic sizes sold at premiums of $2 to $4 above the circular prices of the large companies, but with heavy production the premiums rapidly declined, and by midsummer they had disappeared. Because of the sustained demand the usual spring and summer discounts were not offered, and partly for this reason the average receipts on sales of domestic sizes were higher than in 1925.

[16] U. S. Coal Commission Report: Pt. 1, 1925, p. 51.

The steam sizes showed the competitive pressure of low-priced bituminous coal. The price of independent buckwheat fell sharply after the settlement but recovered partly in the fall of the year. The average receipts obtained by all producers on the steam sizes as a group have been falling since 1920 and continued to decline in 1926. Because of these low prices, especially of rice and barley, shipments of washery and dredge coal were low. Figure 5 shows monthly prices of anthracite.

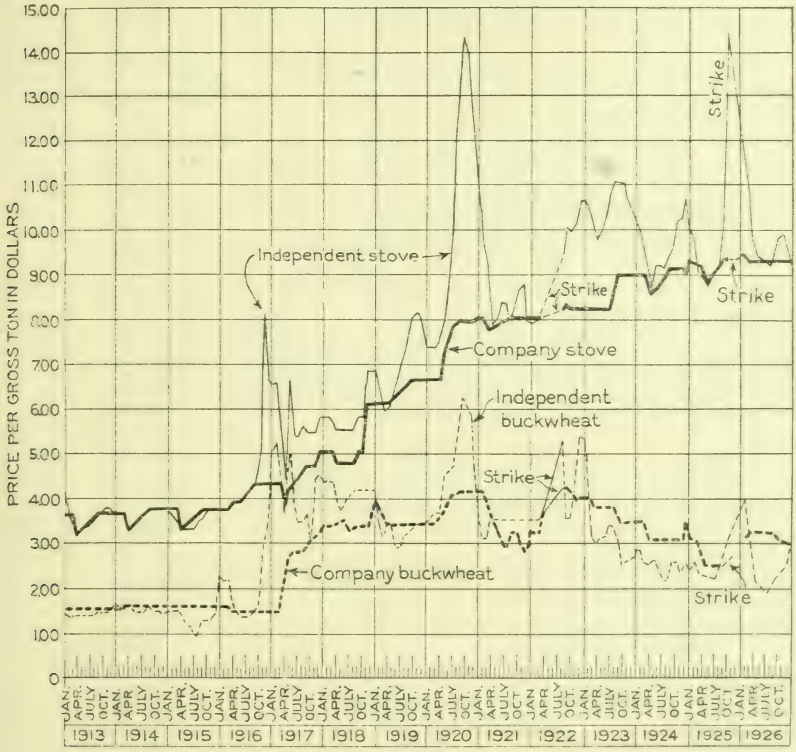

FIGURE 5.—Monthly prices of anthracite f. o. b. mines, as quoted by Coal Age, 1913–1926

The average sales realization per gross ton on shipments of breaker coal, computed in a manner strictly comparable with former years (see Table 18A), was $6.78 in 1926, as against $6.59 in 1925 and $6.77 in 1923. The apparent increase over 1925 is due partly to the fact that no summer discounts were offered. In comparison with 1923, an increase of only 1 cent is shown, in spite of increases in the cost of production.

STATISTICAL SUMMARY

TABLE 1.—*Salient statistics of the coal industry of the United States in 1926*

[Figures for bituminous in net tons; anthracite in gross tons]

	Bituminous	Anthracite
Production:		
Loaded at mines for shipment ..... tons	526, 285, 997	67, 248, 946
Sold to local trade and used by employees ..... do	23, 601, 587	2, 399, 474
Used at mines for steam and heat ..... do	5, 727, 852	5, 742, 162
Made into coke at mines ..... do	17, 751, 549	----------
Total ..... do	573, 366, 985	75, 390, 582
Value at mines	$1, 183, 412, 000	$474, 164, 000
Average value per ton	$2. 06	$6. 29
Average spot price as quoted by Coal Age	$2. 21	(1)
Number of active mines of commercial size:		
Class 1 A (producing 500,000 tons or more)	174	(1)
Class 1 B (producing 200,000 to 500,000 tons)	649	(1)
Class 2 (producing 100,000 to 200,000 tons)	845	(1)
Class 3 (producing 50,000 to 100,000 tons)	867	(1)
Class 4 (producing 10,000 to 50,000 tons)	1, 912	(1)
Class 5 (producing less than 10,000 tons)	2, 730	(1)
Total	7, 177	[2] 326
Stocks of commercial consumers:		
Jan. 1 ..... tons	49, 000, 000	(1)
Apr. 1 ..... do	40, 000, 000	(1)
July 1 ..... do	39, 000, 000	(1)
Oct. 1 ..... do	43, 000, 000	(1)
Dec. 31 ..... do	55, 000, 000	(1)
Net change during year ..... do	+6, 000, 000	(1)
Exports:		
To Canada ..... do	13, 634, 000	3, 520, 000
Overseas and all other ..... do	21, 638, 000	78, 000
Total ..... do	35, 272, 000	3, 598, 000
Imports ..... do	486, 000	727, 000
Consumption (calculated) ..... do	532, 581, 000	69, 021, 000
Capacity of mines with present labor force (assuming 304 working days in the anthracite field and 308 working days in the bituminous field) ..... tons	821, 000, 000	94, 000, 000
Average number of days worked	215	244
Average days idle	93	60
Man-days lost on account of strikes and lockouts	717, 301	5, 990, 477
Number of men on strike during year	29, 348	145, 376
Average number employed:		
Miners, loaders, and shot firers	370, 292	81, 963
Haulage and track	69, 544	20, 000
Other underground	70, 988	24, 268
Surface	82, 823	39, 155
Total	593, 647	165, 386
Output per man:		
Per day ..... tons	4. 50	[3] 2. 09
Per year ..... do	966	[3] 511
Number of cutting machines	17, 466	90
Quantity cut by machines ..... tons	410, 912, 680	831, 183
Methods of mining:		
Undercut by hand ..... per cent	15. 8	(1)
Shot off the solid ..... do	9. 1	(1)
Cut by machines ..... do	71. 7	1. 1
From strip pits ..... do	3. 0	2. 8
Unspecified ..... do	. 4	(1)
Number of power shovels in strip pits	410	99
Quantity produced by stripping ..... tons	16, 922, 695	2, 144, 068

[1] Data not available.
[2] Number of breakers, washeries, and dredges.
[3] Net tons.

TABLE 2.—*Summary of coal produced, value, men employed, days worked, and output per man per day, by States, 1925–26*

[Note that figures relate only to active mines of commercial size; no canvass of wagon mines was made]

State	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
1925														
Alabama	19,056,904	550,491	298,833	98,167	20,004,395	$42,442,000	$2.12	15,596	3,251	3,792	4,458	27,097	246	3.00
Alaska	77,830	3,975	1,063		82,868	405,000	4.89	55	10	26	66	157	243	2.17
Arkansas	1,176,888	20,460	22,691		1,220,039	4,829,000	3.96	2,088	373	388	789	3,638	112	2.99
California, Idaho and Oregon	4,900	7,725			12,625	60,000	4.75	21	3	5	13	42	174	1.73
Colorado	9,454,769	528,098	218,303	109,381	10,310,551	30,322,000	2.94	8,472	1,453	1,269	2,009	13,203	192	[1] 4.07
Georgia	55,532	579	1,412	8,651	66,174	220,000	3.32	37	11	19	70	137	220	2.20
Illinois	62,712,422	3,170,520	1,026,417		66,909,359	146,492,000	2.19	53,242	8,534	8,568	7,479	77,823	161	5.33
Indiana	20,253,156	558,317	413,493		21,224,966	42,884,000	2.02	14,412	2,928	2,031	3,361	22,732	159	5.89
Iowa	3,711,654	905,840	97,349		4,714,843	14,807,000	3.14	7,302	933	1,102	830	10,167	153	3.02
Kansas	4,181,723	282,242	60,286		4,524,251	13,013,000	2.88	5,462	558	592	1,188	7,800	169	3.44
Kentucky	53,721,081	793,337	428,063	126,189	55,068,670	94,825,000	1.72	33,216	7,361	7,462	8,985	57,024	206	4.68
Maryland	2,565,868	111,287	17,417		2,694,572	5,312,000	1.97	2,406	455	266	453	3,580	209	3.61
Michigan	741,449	15,310	51,474		808,233	3,391,000	4.20	1,028	280	132	139	1,579	186	2.75
Missouri	2,384,642	261,099	48,474		2,694,215	8,281,000	3.07	2,994	300	607	1,213	5,114	166	3.18
Montana	2,858,174	131,570	53,942		3,043,686	7,879,000	2.59	1,576	293	360	451	2,680	171	6.64
New Mexico	2,338,094	45,389	51,635	121,733	2,556,851	8,611,000	3.37	2,248	416	322	458	3,444	202	3.68
North Carolina	58,160	524	6,469		65,153	283,000	4.34	65	28	19	28	140	272	1.71
North Dakota	1,035,923	258,183	30,514		1,324,620	2,445,000	1.85	718	74	76	439	1,307	153	6.61
Ohio	24,930,193	2,741,751	362,168		28,034,112	54,057,000	1.93	27,544	3,347	3,935	4,832	39,658	151	4.67
Oklahoma	2,232,901	23,353	69,586		2,325,840	7,667,000	3.30	3,078	853	677	1,023	5,631	153	2.70
Pennsylvania, bituminous	114,456,238	7,584,846	1,517,142	13,369,793	136,928,019	287,899,000	2.10	103,698	14,697	19,067	19,336	156,798	200	4.36
South Dakota	5,180	9,267			14,447	42,000	2.91	49				49	143	2.06
Tennessee	5,040,944	113,934	98,170	200,963	5,454,011	10,077,000	1.85	5,171	1,059	825	1,259	8,314	211	3.11
Texas	982,129	7,940	18,336		1,008,375	1,566,000	1.55	1,406	194	193	315	2,108	150	3.19
Utah	4,349,925	42,235	50,709	247,473	4,690,342	11,991,000	2.56	2,570	585	451	835	4,441	179	[1] 5.90
Virginia	12,032,321	113,573	39,929	613,620	12,799,443	23,496,000	1.84	6,686	2,135	2,442	2,414	13,677	254	3.69
Washington	2,316,191	114,523	56,593	50,483	2,537,890	9,176,000	3.62	2,059	379	537	751	3,726	193	3.52
West Virginia	118,191,674	2,839,028	544,107	806,150	122,380,959	209,655,000	1.71	60,323	17,240	14,795	17,831	110,189	225	4.94
Wyoming	6,245,947	115,757	191,528		6,553,232	18,275,000	2.79	3,934	776	601	927	6,238	178	5.90
Total bituminous	477,172,812	21,351,223	5,776,103	15,752,603	520,052,741	1,060,492,000	2.04	367,456	68,526	70,559	81,952	588,493	195	4.52
Pennsylvania anthracite	53,768,372	2,884,377	5,164,200		61,817,149	327,665,000	5.30	78,773	17,000	24,795	39,744	160,312	182	2.12
Grand total	530,941,184	24,235,800	10,940,303	15,752,603	581,869,890	1,388,067,000	2.38	446,229	85,526	95,354	121,696	748,805	192	4.04

[1] Probably too high because of practice, common in some districts, of men going into mines to shoot coal and load mine cars on days when tipples or mines, as a whole, are not in operation.

TABLE 2.—*Summary of coal produced, value, men employed, days worked, and output per man per day, by States, 1925–26*—Continued

[Note that figures relate only to active mines of commercial size; no canvass of wagon mines was made]

State	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
1926														
Alabama	20,008,638	671,616	269,194	51,514	21,000,962	$48,036,000	$2.29	16,140	3,378	3,506	4,321	27,345	266	2.89
Alaska	82,000	4,450	850		87,300	459,000	5.26	47	8	24	52	131	221	3.02
Arizona		624			624	1,000	1.60	1				1	90	6.93
Arkansas	1,427,798	16,027	15,192		1,459,017	5,497,000	3.77	2,213	251	392	733	3,589	135	3.00
California, Idaho, and Oregon	6,768	10,700	1,240		18,708	70,000	3.74	51	4	16	20	91	103	1.99
Colorado	9,623,680	609,237	249,156	155,152	10,637,225	29,529,000	2.78	8,160	1,456	1,238	1,961	12,815	202	[1] 4.11
Georgia	52,711	689	1,344	5,125	59,869	173,000	2.89				127	127	253	1.86
Illinois	64,611,578	3,734,197	1,021,148		69,366,923	148,604,000	2.14	51,993	8,191	8,104	7,582	75,870	172	5.31
Indiana	22,020,268	748,575	417,163		23,186,006	45,889,000	1.98	14,664	2,623	2,754	3,363	23,404	173	5.72
Iowa	3,791,893	740,136	93,458		4,625,487	14,214,000	3.07	6,438	748	1,006	677	8,869	183	2.85
Kansas	4,014,876	350,540	51,064		4,416,480	12,535,000	2.84	5,700	590	541	1,341	8,172	158	3.43
Kentucky	61,291,208	892,063	491,239	249,952	62,924,462	109,740,000	1.74	35,964	7,443	8,257	8,914	60,578	230	4.52
Maryland	2,955,589	105,283	17,481		3,078,353	6,800,000	2.21	2,449	390	368	474	3,681	235	3.56
Michigan	630,060	7,210	49,437		686,707	2,829,000	4.12	1,111	182	151	129	1,573	171	2.55
Missouri	2,619,691	342,610	46,194		3,008,495	8,951,000	2.98	3,363	322	417	1,168	5,270	174	3.27
Montana	2,638,939	109,254	49,567		2,797,760	6,883,000	2.46	1,445	296	261	417	2,419	162	7.14
New Mexico	2,622,492	51,320	49,671	94,440	2,817,923	8,916,000	3.16	1,930	373	357	507	3,167	251	3.54
North Carolina	51,997	1,485	4,457		57,939	243,000	4.19	65	43	22	25	155	292	1.28
North Dakota	1,066,123	268,551	35,570		1,370,244	2,378,000	1.74	712	70	76	430	1,288	162	6.56
Ohio	24,871,074	2,732,422	268,992		27,872,488	54,759,000	1.96	26,895	3,495	3,462	4,695	38,547	159	4.56
Oklahoma	2,685,787	90,198	66,688		2,842,673	9,042,000	3.18	2,898	688	682	1,132	5,400	183	2.88
Pennsylvania, bituminous	128,338,782	8,007,074	1,492,806	15,202,976	153,041,638	325,618,000	2.13	102,717	16,254	16,988	20,040	155,999	224	4.37
South Dakota	3,960	10,468			14,428	42,000	2.91	52				52	127	2.19
Tennessee	5,375,430	121,446	76,218	215,647	5,788,741	10,975,000	1.90	4,912	1,014	824	1,198	7,948	234	3.11
Texas	1,060,845	12,651	17,662		1,091,158	1,751,000	1.60	1,107	202	105	236	1,650	195	3.39
Utah	4,079,347	42,798	47,716	203,932	4,373,793	10,362,000	2.37	2,174	425	344	602	3,545	186	[1] 6.65
Virginia	13,381,511	121,937	52,979	576,959	14,133,386	27,203,000	1.92	7,008	1,967	2,592	2,197	13,764	263	3.91
Washington	2,410,723	86,660	49,920	39,265	2,586,568	9,350,000	3.61	1,988	370	502	749	3,609	198	3.62
West Virginia	138,359,940	3,590,765	602,048	956,587	143,509,340	264,736,000	1.84	64,389	18,068	17,495	18,774	118,726	247	4.90
Wyoming	6,202,289	120,601	189,398		6,512,288	17,827,000	2.74	3,706	693	504	959	5,862	181	6.15
Total bituminous	526,285,997	23,601,587	5,727,852	17,751,549	573,366,985	1,183,412,000	2.06	370,292	69,544	70,988	82,823	593,647	215	4.50
Pennsylvania anthracite	75,318,820	2,687,411	6,431,221		84,437,452	474,164,000	5.62	81,963	20,000	24,268	39,155	165,386	244	2.09
Grand total	601,604,817	26,288,998	12,159,073	17,751,549	657,804,437	1,657,576,000	2.52	452,255	89,544	95,256	121,978	759,033	221	3.92

[1] Probably too high because of practice, common in some districts, of men going into mines to shoot coal and load mine cars on days when tipples or mines, as a whole, are not in operation.

TABLE 3.—*Production, imports, exports, and consumption of anthracite and bituminous coal, 1917–1926, in net tons*

Calendar year	Production	Imports	Exports to—		Net changes in stocks [1]	Consumption in the United States [2]
			Canada and Mexico	Other countries (sea borne)		
Anthracite:						
1917	99,612,000	13,000	5,917,000	90,000	−450,000	94,068,000
1918	98,826,000	37,000	4,910,000	58,000	+1,120,000	92,775,000
1919	88,092,000	83,000	4,871,000	106,000	+1,680,000	81,518,000
1920	89,598,000	32,000	4,987,000	417,000	−1,560,000	85,786,000
1921	90,473,000	9,000	4,569,000	108,000	+3,855,000	81,950,000
1922	54,683,000	234,000	2,579,000	70,000	−4,530,000	56,798,000
1923	93,339,000	300,000	4,993,000	97,000	+1,635,000	86,914,000
1924	87,927,000	118,000	3,932,000	86,000	+3,310,000	80,717,000
1925	61,817,000	383,000	3,098,000	81,000	−5,040,000	64,061,000
1926	84,437,000	814,000	3,947,000	83,000	+4,000,000	77,304,000
Bituminous:						
1917	551,791,000	1,448,000	18,324,000	5,506,000	----------	529,409,000
1918	579,386,000	1,457,000	18,316,000	4,034,000	+27,900,000	530,593,000
1919	465,860,000	1,012,000	12,064,000	8,050,000	−34,900,000	481,658,000
1920	568,667,000	1,245,000	16,458,000	22,059,000	+22,800,000	508,595,000
1921	415,922,000	1,258,000	13,590,000	9,541,000	+2,200,000	391,849,000
1922	422,268,000	5,060,000	10,938,000	1,475,000	−12,000,000	426,915,000
1923	564,565,000	1,882,000	16,960,000	4,494,000	+26,000,000	518,993,000
1924	483,687,000	417,000	12,746,000	4,354,000	−17,000,000	484,004,000
1925	520,053,000	602,000	13,547,000	3,915,000	+4,000,000	499,193,000
1926	573,367,000	486,000	13,762,000	21,510,000	+6,000,000	532,581,000

[1] Anthracite figures are producers' stocks; bituminous, consumers' stocks. Plus sign denotes coal produced but added to stocks and not consumed; minus sign denotes coal consumed that was withdrawn from stocks carried over from preceding year. Anthracite data from Federal Trade Commission cost reports (Coal, No. 2, p. 27) and hearings before Frelinghuysen coal committee, S. Res. 126, 66th Congress, 1st session (pt. 1, p. 308). These anthracite figures for 1917 and 1918 represent coal years, since then calendar years, and are in part estimates. Bituminous data from reports on consumers' stocks of bituminous coal, issued by United States Geological Survey and article in Coal Age, Aug. 26, 1920, p. 429, by C. E. Lesher, formerly coal statistician, United States Geological Survey, and director of statistical division, United States Fuel Administration.

[2] Production tonnage, plus imports and minus exports, plus or minus the decrease or increase, respectively, of the net change in coal stocks.

TABLE 4.—*Production and value of anthracite and bituminous coal, 1917–1926*

Year	Net tons		Value		Grand total	
	Anthracite	Bituminous	Anthracite	Bituminous	Net tons	Value
1917	99,611,811	551,790,563	$283,650,723	$1,249,272,837	651,402,374	$1,532,923,560
1918	98,826,084	579,385,820	336,480,347	1,491,809,940	678,211,904	1,828,290,287
1919	88,092,201	465,860,058	364,926,950	1,160,616,013	553,952,259	1,525,542,963
1920	89,598,249	568,666,683	434,252,000	2,129,933,000	658,264,932	2,564,185,000
1921	90,473,451	415,921,950	452,305,000	1,199,983,000	506,395,401	1,652,288,000
1922	54,683,022	422,268,099	273,700,000	1,274,820,000	476,951,121	1,548,520,000
1923	93,339,009	564,564,662	506,787,000	1,514,621,000	657,903,671	2,021,408,000
1924	87,926,862	483,686,538	477,231,000	1,062,626,000	571,613,400	1,539,857,000
1925	61,817,149	520,052,741	327,665,000	1,060,402,000	581,869,890	1,388,067,000
1926	84,437,452	573,366,985	474,164,000	1,183,412,000	657,804,437	1,657,576,000

METHODS OF COLLECTING THE STATISTICS

VOLUNTARY COOPERATION

The principal statistics for each State for 1925 and 1926 are given in Table 2. These statistics are obtained from the producers' written reports, most of them signed by officers of the companies that furnish the figures. The reports are collected by correspondence which is supplemented by visits of field agents if correspondence has

failed. The Bureau of Mines has no power to compel the filing of reports.

Under this system accurate results can be obtained only by the generous cooperation of the producers in furnishing returns voluntarily. The operators generally respond cordially to the bureau's questionnaires, with which they have become familiar through more than 40 years of contact and cooperation, so that a very large percentage of the returns is obtained by mail, leaving relatively few reports to be obtained by personal visits.

COMPLETENESS OF THE RETURNS

Commercial mines and wagon mines.—A complete count of the thousands of wagon mines and country coal banks from which bituminous coal is dug in the United States could be made only by sending agents up every creek and along every hillside in the coal-bearing regions. The cost of such a count would prohibit it, and in practice a limit must be set to the size of the mines to be considered. The Federal Census Bureau set this limit at mines producing about 1,000 tons a year for the last decennial census of mines and quarries, taken in 1920. Many of the States that publish statistics set the limit higher. The Pennsylvania Department of Mines, for example, covers only enterprises employing as many as 10 men.

The Bureau of Mines desires to ascertain the total output of coal from all sources, large or small, in order to find the rate at which the country's resources are being drawn upon. In practice, however, it has been found advisable to employ different methods for the commercial mines on the one hand and the wagon mines, on the other.

The line between commercial mines and small workings, however, is difficult to draw. Mere size of output is not a criterion, for some wagon mines ship rather large quantities of coal. Absence of a railroad switch is not a criterion, for this would exclude from the commercial class some large mines that ship by river or truck or that deliver their product to associated industries at the mouth of the mine.

In practice, the Bureau of Mines has found a safer criterion to be size in conjunction with steady operation. All mines that produce 10,000 tons or more a year are classed by the bureau as commercial mines, but the commercial class also includes much smaller mines, some of which have an annual output of hardly 1,000 tons, but produce year after year and show a fairly continuous existence.

These smaller properties sometimes ship by rail but oftener serve a local market by wagon or truck or supply a local manufacturing plant near the tipple. There are many hundreds of such small operations that continue to contribute to the supply of coal year after year, and the bureau endeavors to include them in its lists of commercial producers. A mine may be shifted from the list of commercial mines to the list of wagon mines, or vice versa, as the course of the work at the mine may make such a shift advisable.

Method of obtaining data on commercial mines.—For the commercial mines statistics can be obtained largely by correspondence. To the mailing list new names are constantly being added from the trade journals, from the records of State mine inspectors, from reports of field agents, and from reports by the producers themselves. At

intervals the list is checked against lists kept by associations of operators or State officials and lists of shippers kept by railroad car distributors.

Schedules of inquiry are mailed by the Bureau of Mines to all producing companies listed, and no company is dropped from the list until it has been definitely accounted for. To follow up companies from which no reply is received by correspondence, cooperative arrangements have been made with State geologists and coal-mine inspectors, secretaries of operators' associations, and other local agents, who make inquiry in person and report to Washington. In the Western States the work of following up the returns is aided by the branch offices maintained by the Bureau of Mines at Denver, Salt Lake City, and San Francisco. Areas to which no permanent local representative of the bureau has been assigned can be covered only by sending out field agents from Washington, and the present plans include regular work by such agents every year.

Some of the mines are operated so intermittently that the owners can not be found at the end of the year, and recourse must be had to railroads to find the number of tons of coal shipped by these mines, from which estimates can be made of the number of men employed and the value of the product. Such estimates are made in order to round out totals, but only when the evidence shows that a mine was in operation during the year and when all other means of getting the exact figures have failed. Wherever in this report the inclusion of estimates introduces the probability of significant error that fact is indicated.

Method of obtaining data on wagon mines.—The method just described has yielded satisfactory figures for the operation of mines on the list of commercial producers. To handle the sporadic wagon mines, "fly-by-nights," and "snowbirds" that appear, mushroom-like, at times of shortage and high prices, requires a different method. All these workings are referred to by the bureau as wagon mines, the term in common usage that most nearly describes them. Where these wagon mines are within reach of a railroad and are therefore able to demand railroad cars for shipment of their product, they may have a material influence on the car supply, on the spot price, on the rate of wages, and on the prevailing quality of coal, an influence out of all proportion to the actual tonnages they ship. In 1920, for example, there were more than 4,000 such wagon mines in operation, all demanding railroad cars, and they shipped by rail about 4,500,000 tons of bituminous coal. They are chiefly important in the Appalachians, where coal outcrops abundantly along many of the railroads and surfaced highways. Under such conditions coal can be dug with almost no capital investment. The labor cost at wagon mines is high. Such workings can compete only in periods of high prices but can open or close without thought of fixed charges, depreciation, and maintenance; their only consideration is the price of coal on the spot market.

When coal prices are high, the wagon mines are important enough to be included in the statistics, but how to obtain complete information about them is a problem. After experimenting with various methods the bureau has found that the only feasible plan is to ask each railroad for a list of the wagon mines on its lines that shipped

coal during the year and for the number of cars shipped by each. Such information was generously furnished by the railroads in 1920, 1922 and 1923, and gave virtually complete information as to the number, location, and output of the wagon mines that shipped by rail in those years.

On the other hand, when the price is low, wagon mines close as suddenly as they open and disappear as a factor in the trade; therefore in 1921, 1924, 1925, and 1926 no attempt was made to get information on the output of these mines. Statistics for these years relate to the commercial mines exclusively. It is not to be inferred, however, that the figures given are incomplete. A complete count of all the wagon mines shipping by rail would have added only a few thousand tons to the totals in this report.

Data on labor in wagon mines.—No reports on the number of employees or time worked have ever been obtained from the wagon mines, and in this report all the statistics on men employed, days worked, output per man, and the like for the years in which the tonnage of wagon mines was covered are calculated from the returns of the commercial mines alone.

Omission of country coal banks.—The methods outlined above are believed to yield virtually complete returns for all mines, big and little, that ship by rail or water and for all those of commercial size that serve a purely local market. The data herein do not cover the tiny workings that produce less than 1,000 tons a year and are situated at points remote from a railroad—workings that can best be described as country coal banks. Little openings of this kind, where one or two men dig a few hundred bushels for sale in the neighborhood or farmers come with their wagons and trucks to dig their own fuel, are common in regions where coal outcrops. Although their number runs into the thousands, their combined output is so small as to be negligible; their product does not involve the use of railroad cars and does not compete with the output of commercial mines. When in the past the attempt was made to obtain data on these coal banks regularly, the maximum total output reported for them was about 1,000,000 tons a year, a quantity too small to justify the cost of collecting the information.

UNITS OF MEASUREMENT

The standard unit of measurement adopted for this report is the net or short ton of 2,000 pounds, but as Pennsylvania anthracite is mined and sold by the gross or long ton of 2,240 pounds that unit is used in the section of the report dealing with anthracite. Unless the unit is otherwise expressly stated, the word "ton" as here used means the net ton of 2,000 pounds, to which all other figures, however reported, have been converted.

There is a steadily growing sentiment in favor of the general use of the net ton of 2,000 pounds as the standard unit of the coal trade, particularly for bituminous coal in the Eastern States, where both gross and net tons are now used. The use of both units is, of course, undesirable, but as some State and municipal laws require the use of the gross ton, and as freight rates throughout a part of the Eastern States are now fixed accordingly, it is difficult to make an immediate change to a standard unit. In reports on foreign trade and shipping

rates quantities are expressed in either gross or metric tons, and here, too, the use of more than one unit is undesirable. The general use of the net ton in the United States, even in the anthracite region, is here recommended.

ANTHRACITE, LIGNITE, AND BITUMINOUS COAL

Two industries.—In the statistical reports of the Bureau of Mines the anthracite industry of Pennsylvania and the bituminous coal industry are listed separately. Both produce coal, and between them there exists a certain degree of competition, especially in the sale of the anthracite steam sizes, but the differences in corporate organization, in railroad relations, in geographic position, in natural conditions of mining, in marketing practices, in methods of preparing the coal for the market, and in nature of the demand are so pronounced that they require separate treatment.

Pennsylvania anthracite industry.—The anthracite industry, as understood in the trade and as used in this report, is confined to a narrow area of 480 square miles in eastern Pennsylvania. It includes the familiar Lehigh, Schuylkill, and Wyoming regions and also the little outlying Bernice basin in Sullivan County. In this sharply restricted region are concentrated mines employing 160,000 men and producing 90,000,000 net tons of coal a year.

Other anthracite and semianthracite.—True anthracite is also produced in the Crested Butte area of Colorado and in New Mexico, but the quantities are very small—a few thousand tons only per annum—and the operations have no affiliation with the great Pennsylvania anthracite field; in labor relations, in railroad connections, and in marketing organization they are more closely related to the bituminous mines in the same States. For these reasons they are grouped in the statistics with the bituminous coal industry rather than with Pennsylvania anthracite. For the same reasons, also, the semianthracite mines of Virginia and Arkansas are grouped with the bituminous coal industry. Producing a fuel which, although not true anthracite, is admirably adapted to household use, they yet have no concern with the labor, freight rate, and marketing problems of the close-knit Pennsylvania anthracite industry. The semianthracite mines in Montgomery and Pulaski Counties, Va., produced 264,000 tons in 1926 and those in Arkansas 263,000 tons. The statistics of the bituminous coal industry, therefore, include these small outlying tonnages of anthracite and semianthracite

Lignite.—The statistics of the bituminous coal industry also include those relating to lignite produced in the United States. In the classification of coals adopted by the United States Geological Survey the "black lignites" mined in the far West are termed "subbituminous coals." True lignite, although occurring in enormous amounts in the northern Great Plains and Gulf coast geological provinces, is as yet little mined in the United States. The production in 1926 was about 2,359,000 tons, of which 1,370,000 was mined in North Dakota, 14,000 in South Dakota, 54,000 in eastern Montana, and 921,000 in the lignite area of Texas. Although the producers of this coal have certain problems in common, they do not form a separate national interest, as do the producers in the brown-coal industry of Germany.

Their system of mining resembles that used by the producers of bituminous coal. Some day, when lignite rises to a commanding place in the fuel supply of the country, there will be need of showing it separately in the statistics of production; at present statistics thereon can best be combined with those for the bituminous coal industry.

GENERAL STATISTICS

GROWTH OF THE INDUSTRY

TABLE 5.—*Growth of the bituminous coal mining industry, 1890–1926*

Year	Production (millions of net tons)	Value (millions of dollars)	Men employed (thousands)	Calculated capacity (millions of net tons): At 300 days	Calculated capacity (millions of net tons): At 250 days	Average number of days worked	Average number of men lost on account of—: Strikes	Average number of men lost on account of—: Other causes	Average number of men lost on account of—: Total lost	Value per ton	Net tons per man: Per day	Net tons per man: Per year	Per cent mined by machine	Mined by stripping (thousands of net tons)
1890	111	110	192	370	307	226	9	9	82	$0.99	2.56	579	9	9
1891	124	124	206	413	348	232	9	36	45	.99	2.17	503	1.0	9
1892	127	125	213	423	362	234	9	9	89	.98	2.12	498	9	9
1893	118	120	230	394	334	204	9	9	104	.96	1.72	351	9	9
1894	139	108	245	464	396	171	9	9	137	.81	1.88	480	9	9
1895	146	116	240	487	416	194	9	9	114	.86	1.90	552	9	9
1896	138	115	244	461	393	182	9	9	126	.87	1.88	508	9	9
1897	148	120	248	493	421	196	9	9	113	.86	1.94	586	9	9
1898	167	133	256	557	476	211	9	9	97	.86	1.99	651	9	9
1899	193	148	277	643	550	234	5	66	74	.87	2.13	735	9	9
1900	212	222	304	707	605	234	5	89	76	1.08	2.18	807	3.6	9
1901	220	226	340	733	628	225	5	87	83	1.05	2.14	805	5.0	9
1902	260	291	376	868	744	230	5	87	78	1.12	2.26	761	26.8	9
1903	282	372	416	787	670	226	5	80	80	1.32	2.32	880	27.9	9
1904	270	306	408	826	706	202	5	98	106	1.10	2.11	817	28.2	9
1905	315	395	461	960	817	222	5	86	97	1.26	2.24	894	32.5	9
1906	343	381	478	990	842	234	36	97	165	1.11	2.20	1,017	34.1	9
1907	395	461	513	1,070	872	224	5	79	74	1.17	2.28	769	35.1	9
1908	333	374	516	931	482	193	11	104	115	1.12	2.26	844	37.0	9
1909	380	463	542	1,060	1,016	209	5	88	93	1.07	(2)	(2)	37.5	9
1910	417	469	558	1,092	928	211	35	56	91	1.13	2.46	1,021	40.1	9
1911	406	471	570	1,062	1,008	221	2	45	47	1.16	2.50	1,028	45.4	9
1912	450	518	589	1,177	966	229	50	77	85	1.15	2.48	1,020	48.5	9
1913	478	585	572	1,253	1,077	262	6	75	70	1.24	2.61	1,237	50.1	9
1914	420	493	584	1,099	908	195	59	46	132	1.27	2.73	1,224	51.1	1,281
1915	443	482	567	1,160	1,013	208	4	111	106	1.15	2.91	1,204	53.0	1,822
1916	502	667	562	1,314	1,127	220	4	74	74	1.32	3.20	1,396	56.1	1,933
1917	562	1,240	603	1,499	1,326	240	4	81	85	1.26	3.17	1,315	58.6	1,750
1918	579	1,452	617	1,547	1,350	249	1	78	79	1.28	3.18	1,422	59.3	1,284
1919	466	1,181	622	1,208	1,069	216	37	88	122	1.49	3.06	1,240	59.1	1,532
1920	568	1,130	641	1,506	1,325	226	4	92	88	1.75	3.40	1,485	62.5	1,993
1921	416	1,200	664	1,107	1,107	149	3	103	153	2.59	3.20	1,327	62.5	1,736
1922	422	1,079	588	1,116	982	142	79	88	106	2.12	3.28	1,273	63.2	1,806
1923	565	1,347	706	1,470	1,225	179	2	127	129	2.28	3.47	1,401	66.3	1,548
1924	484	1,062	620	1,271	1,059	171	1	100	97	2.20	3.39	1,378	69.1	1,407
1925	520	1,091	588	1,363	1,136	196	1	114	111	2.10	3.52	1,384	70.3	1,877
1926	573	1,159	594	1,432	1,193	224	1	92	93	2.06	3.61	1,469	72.1	1,923

[1] See footnote 1—Table 42.

[2] Not known.

TABLE 6.—*Growth of the anthracite mining industry, 1890–1926*

Year	Production (millions of gross tons)	Value (millions of dollars)	Employees (thousands)	Calculated capacity at 304 days (millions of gross tons)	Average number of days worked	Net tons per man		Washery and dredge shipments (millions of gross tons)	Per cent of shipments that were domestic sizes (excluding pea) [1]	Per cent of total shipments that came from [2]—		
						Per day	Per year			Lehigh region	Schuylkill region	Wyoming region
1890	41	66	126	63	200	1.85	369	([3])	76.9	17.3	29.7	53.0
1891	45	74	126	68	203	1.98	401	0.1	75.7	15.8	31.5	52.7
1892	47	82	129	72	198	2.06	407	.1	76.0	15.4	30.1	54.5
1893	48	86	133	74	197	2.06	406	.2	74.9	16.0	28.7	55.3
1894	46	78	132	74	190	2.08	395	.6	73.7	16.2	29.1	54.7
1895	52	82	143	80	196	2.07	406	1.1	69.9	15.7	30.7	53.6
1896	49	82	149	85	174	2.10	365	.9	70.3	15.0	30.4	54.6
1897	47	79	150	95	150	2.34	351	1.0	68.5	15.0	29.3	55.7
1898	48	75	146	95	152	2.41	367	1.1	67.3	14.9	28.8	56.3
1899	54	88	140	95	173	2.50	433	1.4	66.1	14.4	29.8	55.8
1900	51	86	144	94	166	2.40	398	2.1	64.7	15.3	30.0	54.7
1901	60	113	145	93	196	2.37	464	2.6	64.2	13.5	29.9	56.6
1902	37	76	148	97	116	2.40	279	2.0	61.0	11.1	27.2	61.7
1903	67	152	150	98	206	2.41	496	3.6	63.6	12.1	27.7	60.2
1904	65	139	156	99	200	2.35	469	2.8	62.0	12.4	28.5	59.1
1905	69	142	165	98	215	2.18	470	2.6	60.9	12.8	28.8	58.4
1906	64	132	162	99	195	2.25	439	3.8	59.1	12.6	28.8	58.6
1907	76	164	167	106	220	2.33	512	4.3	58.6	12.4	30.0	57.6
1908	74	158	174	113	200	2.39	478	3.6	59.3	12.0	27.9	60.1
1909	72	149	([4])	107	205	([4])	([4])	3.7	58.3	12.2	27.2	60.6
1910	75	161	169	100	229	2.17	498	3.3	58.6	13.3	27.5	59.2
1911	81	175	173	100	246	2.13	524	3.2	59.4	13.9	27.4	58.7
1912	75	178	174	99	231	2.10	485	3.2	60.8	13.6	28.2	58.2
1913	82	195	176	97	257	2.02	520	2.1	61.7	14.4	27.4	58.2
1914	81	188	180	101	245	2.06	505	1.7	61.4	14.7	26.3	59.0
1915	79	185	177	105	230	2.19	504	2.5	60.1	14.9	26.5	58.6
1916	78	202	160	94	253	2.16	548	3.1	60.5	14.1	29.3	56.6
1917	[5] 89	284	154	95	285	[5] 2.27	[5] 646	5.4	61.0	14.9	28.6	56.5
1918	[5] 88	336	147	92	293	[5] 2.29	[5] 672	6.6	60.1	15.1	28.9	56.0
1919	79	365	155	90	266	2.14	570	3.3	64.2	15.5	28.5	56.0
1920	[5] 80	434	145	90	271	[5] 2.28	[5] 618	5.0	63.1	14.6	30.4	55.0
1921	81	452	160	91	271	2.09	567	1.6	66.5	13.5	28.9	57.6
1922	[5] 49	274	157	98	151	[5] 2.31	[5] 349	3.2	62.9	13.9	31.8	54.3
1923	83	507	158	95	268	2.21	592	4.1	63.7	13.9	30.4	55.7
1924	79	477	160	87	274	2.00	550	1.4	65.3	13.5	28.5	58.0
1925	55	328	160	92	182	2.12	386	1.4	66.4	14.0	29.1	56.9
1926	75	474	165	94	244	2.09	511	1.4	66.7	14.0	28.3	57.7

[1] Excludes Sullivan County and dredge coal.
[2] Includes dredge shipments, 1914–1926.
[3] Less than one-tenth million tons.
[4] No data.
[5] Years of heavy washery output.

TREND OF COAL DEMAND AS AFFECTED BY FUEL ECONOMY AND COMPETITION OF OTHER SOURCES OF POWER

Probably the most significant development in the coal market of recent years is the change in demand which has followed the Great War. Up to 1918 the output of coal in the United States increased with remarkable regularity. The steady advance was interrupted only by strikes, as in the anthracite industry in 1902 and 1906, or by temporary depressions of general business, as in the bituminous trade of 1893–94, 1904, 1908, 1911, and 1914–15. (Fig. 6.) Especially rapid was the growth of the bituminous coal industry, the output increasing at the average rate of 16,800,000 tons a year.[17]

[17] Coal in 1923, pp. 519–520.

Since the war, however, the former growth has been checked, or even for a time entirely stopped. The coal industry, accustomed for generations to a growing demand, has had to face the problem of an arrested demand. Intensified by the fact that in the meantime productive facilities have increased, the modified demand has aggravated the tendency to overproduction and has borne heavily upon prices, profits, and wages. It is an underlying cause though, of course, not the only cause, of the widespread depression in the coal trade, not only in America, but in Europe.

The chief elements in the change in demand are greater efficiency in the use of fuel and competition of other sources of power, and the

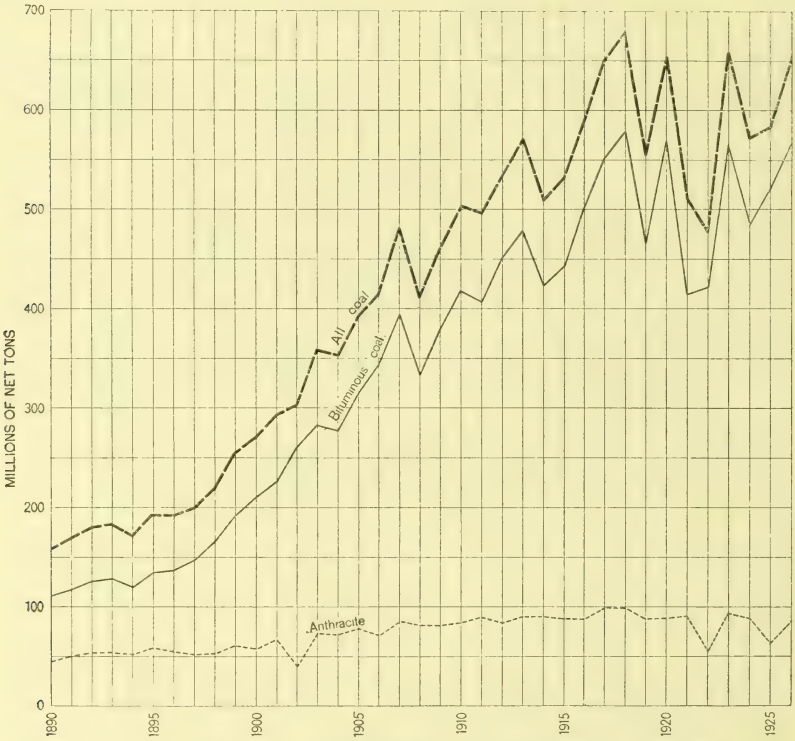

FIGURE 6.—Production of anthracite, bituminous coal, and all coal, 1890–1926

bureau has received many requests for information as to the extent of these tendencies and their effects upon the coal industry. The following is adapted from a lecture given by a member of the bureau at Carnegie Institute of Technology.[18]

THE FACT OF ARRESTED DEMAND

The extent of the change in demand can be grasped by comparing the present production with a forecast made by a recognized authority some years before the war. In 1908, at the request of the Roosevelt

[18] Changes in the demand for coal, by F. G. Tryon, Apr. 6, 1927.

Conservation Commission, E. W. Parker [19] studied the rate of growth of coal production in the United States during the preceding hundred years and projected the curve of output a hundred years into the future. The forecast was intelligent and conservative, and had other observers attempted the task at the same time they would probably have reached much the same result. Indeed, for 10 years or more the actual production ran ahead of Parker's forecast. Since the war, however, production has run much behind the forecast. By 1925 Parker had foreseen a production of all coal—anthracite and bituminous—amounting to 760,000,000 tons. The actual production of 1925 was 582,000,000 tons, or about 180,000,000 tons below the forecast.

Even in 1926, when the home demand was augmented by the purchase of at least 10,000,000 [20] tons of coal for storage and when the strike of the British miners threw 15,000,000 tons of abnormal exports to American producers, the output fell 120,000,000 tons short of Parker's forecast. If consumption is considered rather than production, thus eliminating the deceptive effect of the extraordinary exports and the flow of coal into storage, it is clear that 1926 was 145,000,000 tons below the forecast. That is a very significant fact. For business in general, 1926 was a year of abounding prosperity in the United States. Aside from agriculture, which consumes but little coal, it would be hard to find a year in our economic history when the usual barometers of business were more favorable than in 1926, and yet on the basis of all pre-war experience the consumption in 1926 fell 20 per cent below what might have been expected.

CAUSES OF THE CHANGED OUTLOOK

Why, then, has the demand in recent years fallen so far short of expectations? The big causes are fuel economy and the competition of other sources of energy—oil, gas, and water power—but before discussing these it is well to dispose of three smaller factors.

In some degree the slowing down of demand is due to the fact that population is not increasing as rapidly as formerly. The birth rate is falling and immigration has been checked. This is a factor, but not an important one.

In some degree, also, the change is a trick of figures, a sort of statistical refraction. The records are expressed in tons while the consumer really burns heat units. The coal shipped to-day is certainly prepared more carefully than it was in 1918, perhaps even than in 1913. Moreover, the shift of business from the northern to the southern fields has acted to increase the proportion of high British thermal units coal in the total shipments.[21] This element of quality can not be measured accurately; it is a factor, but in any comparison between pre-war and post-war demand a relatively small factor.

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[19] Parker, E. W., "Past and future coal production in the United States": Mines and Minerals, May, 1908, vol. 28, pp. 462–463.

[20] Of this, 6,000,000 tons was bituminous coal (Table 3) and 4,000,000 tons was anthracite. The figure for anthracite is an estimate of the increase in producers' stocks and takes no account of the change in stocks of retailers and householders.

[21] A rough computation of the average heat values of the coal produced in 1913 and again in 1925, made by weighting representative values for each State by the tonnages produced in the two years, indicates that the national average for 1925 was hardly 1 per cent higher than that for 1913.

In part, the change in coal demand is a sign of a shift in the kind of goods manufactured in the United States, a shift toward goods that require a smaller consumption of fuel per dollar of product. As a nation matures in economic life a larger part of its population is occupied in producing highly fabricated goods and a smaller part in producing crude heavy materials. There are signs that America is throwing relatively more of its labor and capital into the work of converting crude materials into more elaborate forms. A thousand men making automobiles will require less coal than a thousand men making steel rails. At any rate, it is a fact that the per capita production of pig iron is not increasing as rapidly as it was before the war. In 1900 the country produced 405 pounds of pig iron per capita; in 1913, 720 pounds; in 1926, 760 pounds. Thus, from 1900 to 1913 the per capita production of pig iron increased 315 pounds; from 1913 to 1926, an equal period of time, it increased only 40 pounds. The change is partly explained by the increasing use of scrap; as the working capital of the metal grows, the quantity of secondary metal is larger.[22] Whatever the explanation the fact helps to explain the slowing down of the demand for coal, because the iron furnaces consume in coke alone about one-eighth of the entire output of bituminous coal.

FUEL ECONOMY

A much more important cause of the change in demand for coal is the great improvement in the efficiency of fuel utilization.

Stimulus of high prices.—The World War, with its high prices and actual shortage, drew the attention of consumers to economy in the use of fuel to a degree unknown before. The results were not apparent at the time; they are making themselves felt years after the high prices have disappeared. In this respect the demand for coal differs from that of many commodities. If the price of potatoes rises, the consumption falls sharply and as sharply climbs again when the price recedes. The demand for coal, on the contrary, is highly inelastic; a small shortage in terms of per cent of what is needed produces a violent increase in price. On the other hand, a great reduction in price has little immediate effect in increasing the total amount consumed, although it may enable one coal field to compete with another more successfully. In reality, the demand for coal is like a lump of tar in cold weather—it yields very little to sudden pressure but if the pressure is long continued will flow out of shape and perhaps never return to its original position. The runaway prices of 1917, 1920, and 1922 produced little effect at the time, but they set up influences which have persisted ever since. The electric utilities, especially, found themselves pinched between the rising price of coal and the fixed prices of their product. Efficiency in the use of coal was their only salvation. Fuel economy became the fashion. The route to promotion was seen to lead through the boiler room, and the best brains of the electric-power industry were directed to squeezing more and more kilowatt-hours out of the same ton of coal.

Rapid advances in fuel efficiency—Record of the electric utilities.—Of course, the idea of increased efficiency in combustion is not new.

[22] On the other hand, as the richer ores are exhausted and leaner or more refractory ores have to be used, the quantity of fuel per ton of iron produced will tend to increase.

Improvements have been going on ever since Watt took hold of the old atmospheric engine and made it into his steam engine. The engines before his day burned 30 pounds of coal per horsepower-hour. His engine cut the combustion first to 10 and then to 6 pounds, and ever since engineers have been at work on the problem of getting more power out of the same quantity of fuel. It is readily proved, however, that the rate of increase in fuel efficiency since the World War has been much more rapid than before. As a measure of pre-war fuel efficiency the performance of the trans-Atlantic steamers, which is of record for a century back, may be taken. In 1820 the *Savannah*, the first ship to cross the ocean under steam power, burned about 10 pounds of coal per horsepower-hour. By 1907 the unit consumption had been cut to 1.4 pounds in the *Lusitania*. Measured in pounds, this seems an enormous decrease, but the significant thing is the rate of change in per cent of the existing practice, and this decrease of 86 per cent from the *Savannah* to the *Lusitania* was spread out over a period of 87 years. By comparison, the rate of

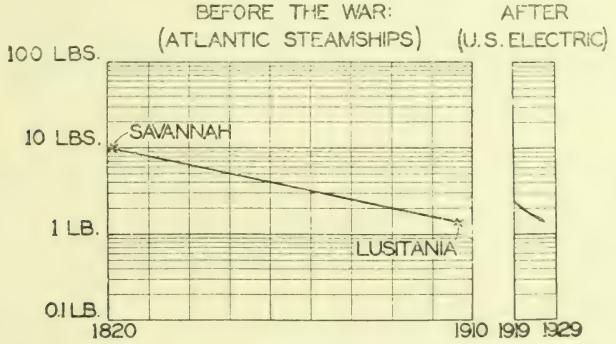

FIGURE 7.—Comparative rate of progress in fuel efficiency of the steam engine before and since the World War, as indicated by the coal consumed per horsepower hour

improvement shown by American electric utilities since the war is very much greater. They have cut the average consumption per horsepower-hour from 2.4 pounds in 1919 to 1.46 pounds in 1926, and this decrease of 39 per cent has been concentrated in the short space of seven years. The point becomes very clear if these changes are plotted on logarithmic scale which shows at a glance the rate of change as distinct from the absolute amount of change. (Fig. 7.) It will be seen that the line of decrease in unit fuel consumption from the *Savannah* to the *Lusitania* is very much less steep than the line for the electric utilities since the war.

Replacement of isolated steam plants by central-station power.—At first thought this decline in the consumption per kilowatt-hour appears to be offset by the increase in the number of kilowatt-hours generated. The coal producer notes that in 1926 the electric utilities burned 43,000,000 tons of coal as against 37,000,000 in 1919 and reasons that the increasing use of electricity has more than counterbalanced the increasing efficiency and that the net result is an increase in coal demand. This conclusion overlooks the fact that as the electric utilities have been expanding the isolated steam plants by which

manufacturers used to make their own power have been shutting down. In 1919, 32.4 per cent of the horsepower equipment in manufactures was run by central-station power. By 1925 this had increased to over 50 per cent. Thus, the reduction in fuel consumption per kilowatt-hour from 1919 to 1920 affected about one-third of the power used in manufactures, but the reduction in consumption per kilowatt-hour from 1925 to 1926 applied to more than half of the power in manufactures.

Locomotive fuel.—This story of increasing fuel efficiency, intensified by the high prices of the war period, is found wherever records of fuel

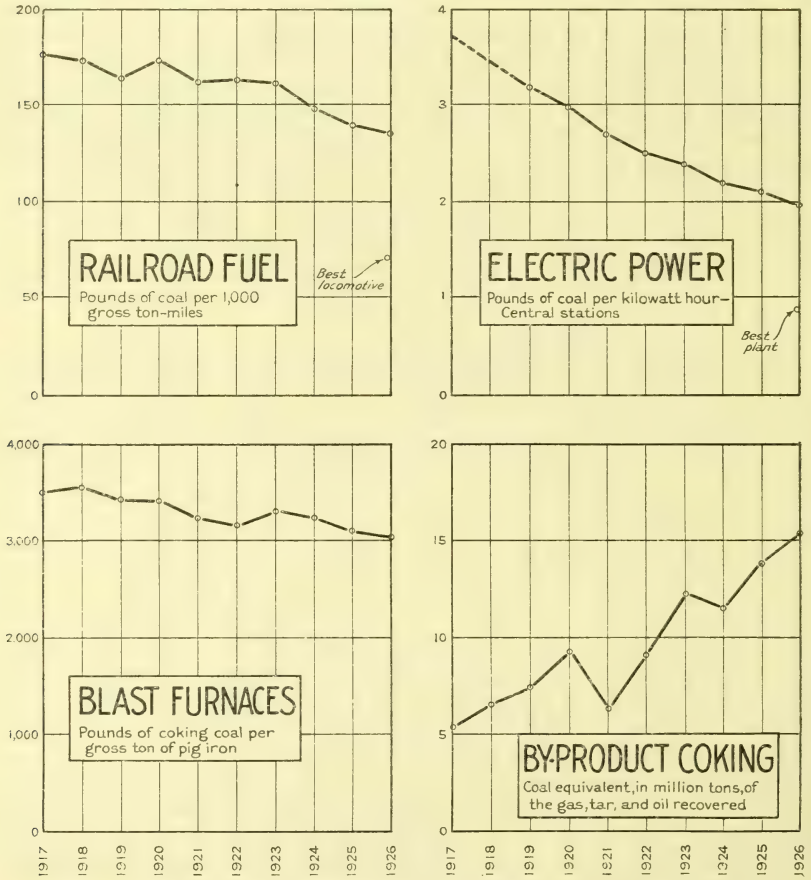

FIGURE 8.—Trends in fuel efficiency in the United States, 1917–1926

performance are kept. Consider, for example, the performance of steam locomotives on Class I railroads, shown in Figure 8. In 1917 the consumption of coal per thousand gross ton-miles was 176 pounds. By 1926 it had dropped to 137 pounds, a decrease of 22 per cent. In 1917 the consumption of coal per passenger-train car-mile was 19.4 pounds; by 1926 it had dropped to 15.8 pounds, a reduction of 19 per cent.

Iron and steel industry.—Corresponding advances were made by the iron and steel industry. (Fig. 8 and Table 11.) In 1917 the consumption of coking coal per gross ton of pig iron made was 3,524

pounds. In 1926 it had dropped to 3,004 pounds, a decrease of 15 per cent. The decrease is associated with the rise of the by-product coke oven, which recovers a larger percentage of the coal charged in the form of merchantable coke and produces coke of a quality actually superior for blast-furnace use. Moreover, this statement about the economy in the iron and steel industry takes no account of the savings of heat values through the recovery of gas, tar, light oils, and breeze. (Fig. 8.) Through these by-products the simple extension of by-product in place of beehive coke since 1913 represents an annual saving of at least 15 per cent of the coal used for coke.

And the experience of the utilities, the railroads, the iron and steel industry has been paralleled by many other manufacturing industries. A leading firm of fuel engineers who have examined many hundreds of factory boiler plants reports that the average operating efficiency of the boilers they have recently tested is 58 per cent, and that by proper engineering supervision the average of the same plants has been raised to 70 per cent. This advance of 12 points in thermal efficiency represents a saving of 17 per cent in the amount of fuel required to produce the same amount of goods attainable simply by better utilization of existing equipment.[23]

FUTURE TRENDS IN FUEL ECONOMY

The real question of interest is how long the tendency toward higher efficiencies will continue. It may be assumed that the present efficiencies will not be abandoned and that people will not deliberately waste coal after they have learned to burn it efficiently, simply because it has become cheaper.

Declining price of coal.—The present declining price of coal doubtless tends to retard the advance of fuel efficiency. It is worth noting, however, that the price in which the consumer is interested is the delivered price and that a large percentage reduction in the cost of mining often makes a relatively small percentage reduction in the delivered cost. The average sales realization on Fairmont coal in 1925 was less than $1.50 a ton. If we assume slashing the costs 33⅓ per cent, bringing the price f. o. b. mines down to what it was before the war, we would reduce the price delivered in Boston by only 10 per cent, and the decision of the consumer as to whether a new piece of equipment designed to reduce fuel consumption would pay would turn on the reduction of 10 per cent at Boston, not on the 33⅓ per cent at Fairmont.

Limits of efficiency.—All will agree that the present rapid rate of improvement in fuel efficiency is not likely to continue indefinitely. The progress since 1917 is largely a taking up of slack, a rapid application of principles that were already known to engineers, and a general adoption of practices which the best plants had already worked out. Some day the slack will be taken up and the reduction in quantity consumed per unit of product will go on at a slower pace.

Further, there are practical limits, if not absolute theoretical limits, to the extent to which fuel economy can go. In a given state of engineering technique there will be a point where the capital cost

[23] Gould, G. B., and Henderson, D., Even Better Steam Generation: Fuel Engineering Co. of New York, 1927, pp. 4, 30.

of a given saving of fuel is greater than the value of the fuel saved. It is said the point is about reached in electric-power generation where increasing fuel efficiency is offset by the fixed charges on the additional equipment.

No immediate limit in sight.—On the other hand, the advances in fuel efficiency give no promise of terminating abruptly. The curves of unit consumption in Figure 8 suggest that the amount of the reduction in pounds of fuel per unit of performance is becoming less year by year, but that there is no sign of the reduction stopping entirely in the immediate future. The saving of raw coal through the recovery of the gas, tar, and oil formerly wasted in beehive coke ovens is approaching a limit as the substitution of the by-product for the beehive oven nears the point of saturation, yet at the end of 1926 there were 978 new by-product ovens under construction with a yearly capacity of 6,000,000 tons of coke. This indicates that the proportion of the output produced in by-product ovens, which amounted to 78 per cent of the total in 1926, is destined to go still higher.[24]

In the field of locomotive fuel, which still absorbs a fourth of the supply of coal, the limit has clearly not been reached. The average consumption by freight locomotives per thousand gross ton-miles (including locomotive and tender) in 1926 was 137 pounds (Table 9), but the Union Pacific Railroad has a new locomotive which has been operating at 70 pounds, and that on relatively inferior coal averaging about 11,000 B. t. u.[25] per pound. Such high efficiency is obtainable only under the most favorable conditions where large locomotives pull heavy trains over long hauls, conditions which are not attainable on much of the traffic of the country, even where the carriers could afford the requisite investment in new equipment. Nevertheless, there is evidently room for improvement in bringing average performance closer to the present level of good performance.

In electric power generation, also, the average efficiency has not reached its limit. (Table 8 and fig. 8.) The average consumption in 1926 was 1.95 pounds per kilowatt hour. A number of plants, however, are down to 1 pound per kilowatt hour, and the Columbia Gas and Electric station at Cincinnati has touched a record of 0.85 pound. Moreover, the process of replacing direct steam power in industry by purchased electric power has not reached the saturation point. About 40 per cent of the installed horsepower in manufactures was still nonelectrified in 1926, and a considerable part of the electrified portion had not been taken over by the central stations.

Even the heating of dwellings, which still absorbs nearly one-fifth of the output, is being improved, and increased efficiencies here, too, are expected.

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[24] Preliminary returns indicate that in the month of December, 1927, when depression in the steel industry curtailed the demand for metallurgical coke, the by-product ovens produced 90 per cent of the total. The opinion is often expressed that the marginal requirements of furnace coke in times of extremely active demand can most economically be supplied by the beehive ovens already in existence because of their flexibility of operation and relatively small capital charge when standing idle.

[25] McAuliffe, E., Railway Fuel: New York, 1927, p. 323.

COMPETITION OF OTHER SOURCES OF POWER

Visible competition.—The second great factor in the changing demand for coal is the competition of other sources of power. While coal production has been virtually standing still since the war, the competitive sources of energy—oil, natural gas, and water power—have been growing at much the old rate. A part of this competition is visible. The construction of hydroelectric plants, stimulated by the Federal water power act as well as by the price of fuel, has been especially rapid since 1920. In 1920 the production of hydropower by public utility plants was 16,150,000,000 kilowatt-hours. (Table 8.) In 1926 it had increased to 26,189,000,000 kilowatt-hours, and the increase may be reckoned as equivalent to 20,000,000 tons of coal.[26] How much coal has been directly replaced by fuel oil during the same period is not known accurately. Figures of the American Petroleum Institute indicate that the use of fuel oil and crude oil burned direct as fuel jumped from 296,000,000 barrels in 1920 to 411,000,000 in 1925. The increase of 115,000,000 barrels is equivalent to 30,000,000 tons of coal, but it should be noted that much of the increase was absorbed in producing and refining the oil itself.

Invisible competition.—The direct competition of fuel oil and water power, however, is only a part of the story. There is an invisible competition from the refined products of petroleum. Gasoline is meeting a demand that would otherwise have fallen to coal, if not directly then indirectly, through the medium of electricity. The world's potential demand for power and heat would probably not be much less if there were no gasoline. It would tend to seek satisfaction in some other way. Coal, though somewhat more costly and less convenient, could largely have satisfied the demand.

Consider, for example, the enormous expansion of the gasoline automobile. Had gasoline not been available, the need of transportation would have stimulated alternative means, such as light railroads, electric traction lines or electric motor cars, all of which rely chiefly on coal-produced energy.

This invisible competition between the several sources of power is a factor that must be reckoned with in the changing demand for coal. The questions are really, "Is the country's aggregate demand for power and heat—or 'energy,' to use a single word—falling or rising? How much of that aggregate demand is being met by means of coal? How much by means of fuel oil, gasoline, kerosene, and natural gas? How much by means of falling water?" The problem is largely one of measuring the relative rates of growth of the several sources of energy.

Rise of coal's competitors.—If both the visible and the invisible items are counted, the rise of coal's competitors is notable. This is unmistakably clear when the production of the several sources of energy is plotted on logarithmic scale so as to get rid of the deceptive effect of the absolute change in tons or barrels and to show instead the rate of change. (Fig. 9.)

[26] In making this computation, a unit consumption of 4 pounds of coal per kilowatt-hour has been assumed. This is higher than the unit consumption of central steam-electric power plants, but probably lower than the unit consumption of the isolated plants which much of the new hydropower went to displace.

On logarithmic scale, a straight sloping line means an increase at a uniform percentage from year to year; in other words, an increase like compound interest. From such a diagram it is clear that before the war the output of all coal, both anthracite and bituminous, was increasing something like compound interest. No fact of our industrial life was more significant or more constant. To be sure, the output of coal fluctuated with the booms and depressions of the business cycle, but the trend was sharply upward, and the nature of

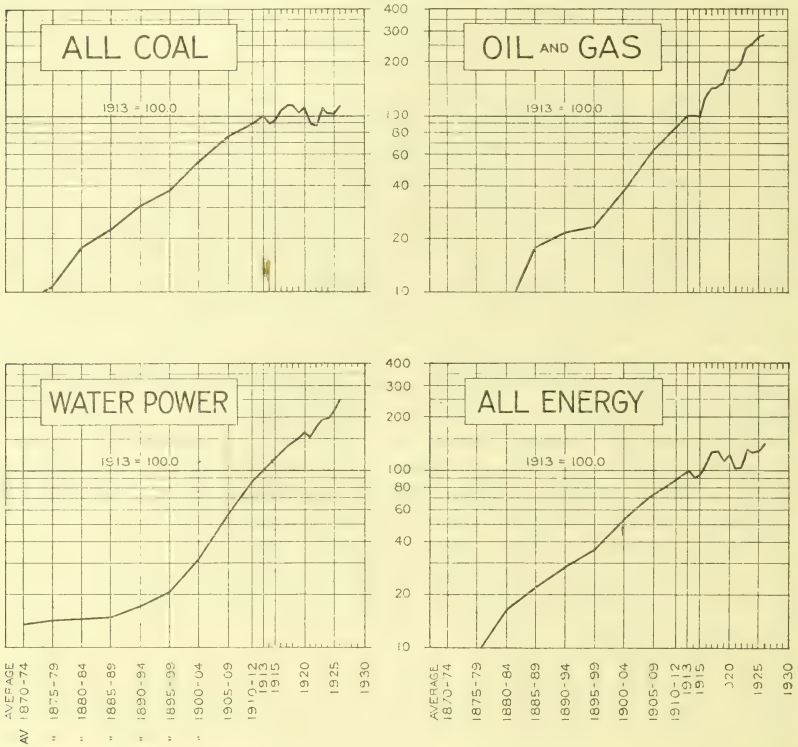

FIGURE 9.—Relative rate of growth of annual supply of coal, oil and gas, and water power in the United States, 1870–1926

the trend was, on the whole, the compound interest curve. Beginning with the war, the former rate began to slacken. A high point was, indeed, reached during the war itself, but since then coal has failed to show any advance. It has zigzagged, sometimes above and sometimes below the level of 1913, and for 1926 the consumption was only 15 per cent above 1913, whereas on a basis of pre-war expectations it would have been something like 50 per cent above 1913.

On the other hand, oil, gas, and water power, when plotted on logarithmic paper, show an increase since the war at very much like

the old rate and very different from the arrested growth of coal. The changes may be summarized in a word. In 1926 the country was using all coal—anthracite and bituminous—at a rate 15 per cent above 1913; oil and gas at a rate 188 per cent above; and water power at a rate 154 per cent above. (Fig. 9.)

Total consumption of energy increasing.—Thus, the increase in oil, gas, and water power has largely offset the stationary production of coal; and if all the sources of energy are combined on the basis of heat value into one curve, it shows a substantial increase, even since the war. In 1926 the country was using these energy materials at a rate 41 per cent above the 1913 rate, and if allowance is made for the improvement in fuel efficiency already referred to it will be seen that the total demand for power and energy has not slackened greatly, but has gone on increasing since the war at a rate not much below what was formerly considered normal.

Relative proportions of several sources of energy.—As a result of these changes coal has lost in relative standing as a source of energy. Coal is still the dominant source, but whereas in 1913 it contributed 84 per cent of the total energy consumption in 1926 its share had fallen to 69 per cent. Oil and gas, on the contrary, showed a remarkable increase, rising from 12 per cent in 1913 to 25 per cent in 1926. Water power also increased from 3.3 per cent of the total to 6 per cent.

There was a time when the other sources of energy were considered insignificant, but that idea must now be modified. Coal is still dominant, the others are still supplementary, and it is still true that the future of the country is tied to its reserves of coal, but the competing sources have increased fast enough to help arrest the demand for coal and thereby to influence the coal market profoundly. To-day no single fact is of greater importance to the coal producer than the future developments of these competing sources of power.

THE FUTURE OF COAL DEMAND

Total energy demand will continue to grow.—What do these figures suggest as to the future demand for coal? In the first place, they suggest that the total demand for power and heat in all forms is still increasing at a wholesome rate and may be expected to continue its growth. It will not only grow with population, but the per capita consumption will probably increase.

Competition of oil and gas the uncertain factor.—Clearly, the variable factor is the competition of the other sources of power. What they do not supply out of the total requirement for all energy falls back upon coal. The possibilities of water power are limited. It is, indeed, growing faster than coal at present, but it appears unlikely that water power will take over more than a minor part of the total energy burden, and every advance in fuel economy further limits the water-power sites that can economically be developed. To this extent the factor of improving fuel efficiency tends to offset the factor of competition of water power. The great variable, the most uncertain factor in the future demand for coal, is thus seen to be the competition of oil and gas. Most observers expect the production of petroleum to decline sooner or later, and when it does a great increase in coal consumption may be looked for.

EFFECTS OF THE CHANGES ON THE BITUMINOUS COAL TRADE OF THE UNITED STATES

To the consumer of coal the changing market has brought lower costs of fuel. The improvements in fuel efficiency have added centuries to the life of our resources and helped to reduce the delivered cost of power. They are a permanent economic gain. The low prices

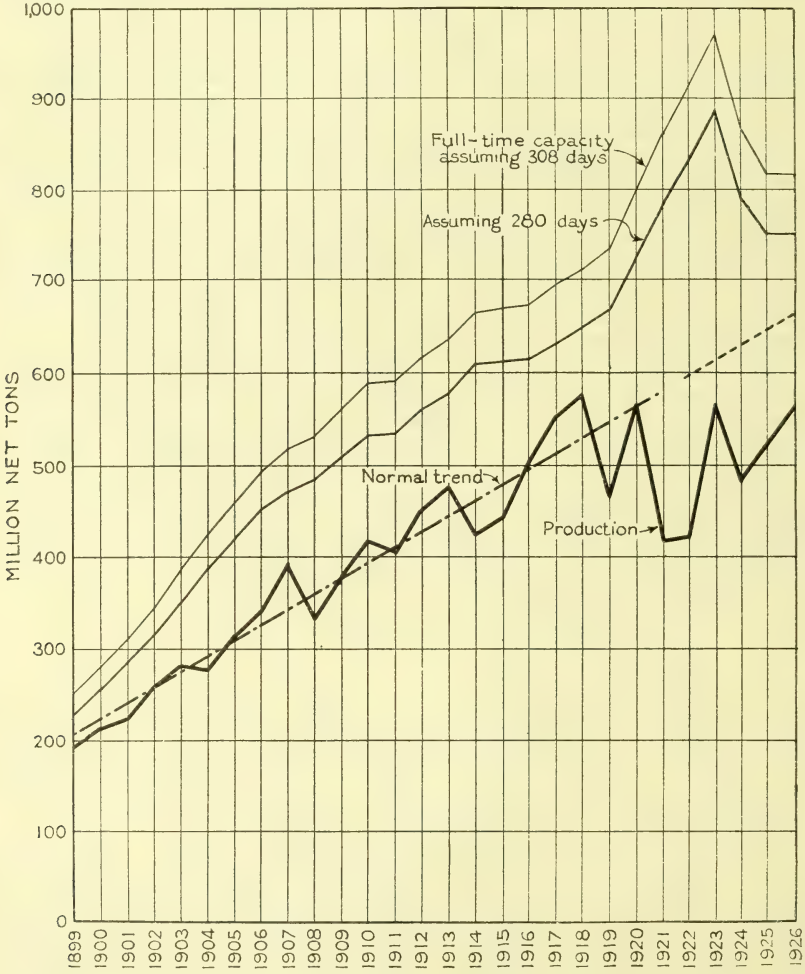

FIGURE 10.—Comparison of mine capacity and actual production of bituminous coal in the United States, 1899–1926

of coal and oil and the development of hydroelectricity, where only high-freight coal could be had before, have helped to make heat and power cheap and more abundant and have contributed largely to the general prosperity.

To the bituminous coal industry, however, the changing market has brought grave difficulties. The change came upon an industry in which the producing capacity already exceeded the demand. There is no need to stress unduly the effect of "the overdevelopment

of the bituminous industry." It is realized that excess capacity is characteristic of many other industries besides coal.

The existence of a considerable excess capacity in bituminous coal mining is not new. There was idle capacity before the war, but at that time the normal growth of demand always tended to absorb the excess. The result was that for 20 years capacity and demand grew together, capacity always considerably in advance of demand but by a fairly constant ratio. (Fig. 10.)

The high prices of the war stimulated the process of expansion. Thousands of new mines were opened, and the existing mines were reequipped with modern machinery. Between 1915 and 1923 some 275,000,000 tons were added to capacity, a rate of increase far above that of the pre-war days. The fact of this war-time expansion is something that every coal operator knows. Quite as significant was something that he could not see so easily—the fact that the demand had stopped growing. The increase in tonnage to which the industry had become accustomed over a hundred years did not materialize. There was no annual increment of 16,800,000 tons of new business to absorb the capacity which the war had created, and when the factor of stationary demand was added to the factor of excess capacity a readjustment became inevitable.

The effect was obscured for a time by the transportation situation. During most of the period from 1916 to 1923 the immediate factor limiting the production of bituminous coal, when the mines were not closed by strikes, was railroad disability. As long as the car shortage appeared whenever production reached 10,000,000 tons a week and as long as 12,000,000 tons seemed the practical limit of railroad performance a mine capacity of 17,000,000 tons a week and even the arrested demand had little effect on prices. But as soon as the "car shortage" was eliminated, as it was late in 1923, the market change pressed down upon the industry with crushing weight. The railroads could now handle the traffic offered without complaint,[27] and the full effect of excess capacity and the arrested demand became apparent.

The bituminous coal industry had endured hard times, before, but never, so far as reflected in the statistical record, as hard as those it was now to experience. The depression was most acute in the Northern States, but it was felt in the South also. The story is told by the figures of 1926 as compared with 1923. For the first time in the 37 years covered by the record there was an absolute reduction in capacity. In former depressions the growth of capacity had sometimes been checked. This time it dropped from 885,000,000 tons in 1923 to 747,000,000 in 1926.[28] The change involved shutting down 2,154 mines (commercial mines, not wagon mines), laying off 111,000 men, and cutting average sales prices by 23 per cent.

Obviously there were many factors in this situation besides the changing demand. There was the important factor of the new capacity created by the war, and there were a number of human factors.

[27] Production in the week ended Dec. 4, 1926, reached 14,551,000 net tons, and there was no evidence of car shortage.

[28] Capacity of the mines that produced coal during the year calculated by dividing the production in tons by the average number of days worked and multiplying by 280 days. The theoretical working year is 308 days, but, as pointed out by the coal and coke committee of the American Institute of Mining and Metallurgical Engineers, it is impossible to maintain production at the same rate when working full time as when working part time. In calculating capacity the committee, therefore, takes a working year of 280 days, a conservative figure.

Labor relations, union and nonunion competition, differences in wage rates and labor costs, differentials in freight rates were all involved and to many have seemed paramount. Surrounding and complicating them all, however, was the element of changing demand.

TABLE 7.—*Indicators of the effect of fuel economy on consumption of coal per unit of performance since the war*

	Pounds	Per cent reduction
Steam railroads:		
Pounds per 1,000 gross ton-miles freight service—		
Average, 1919–20	170	
Average, 1926	137	19.4
Pounds per passenger-train car-mile—		
Average, 1919–20	18.5	
Average, 1926	15.8	14.6
Steam electric power plants:		
Pounds per kilowatt-hour, 1919	3.2	
Pounds per kilowatt-hour, 1926	1.95	39.1
Iron and steel—Pounds coking coal per ton of pig:[1]		
1918	3,577	
1926	3,004	16.0
Coke manufacture: Savings of heat values through recovery of gas tar, light oils, and breeze by extension of by-product in place of beehive coking, 1913 to 1926, expressed as per cent of coal used for all coke in 1926[2]		15.4

[1] Includes only savings through higher yields of merchantable coke per ton of coal charged and lower consumption of coke per ton of iron. Excludes economies through recovery of by-products, which are treated in next item.

[2] These by-products are used in part for boiler fuel, in part for metallurgical purposes, in part for domestic heating and cooking, and to a small extent for automotive fuel.

TABLE 8.—*Fuel consumption by electric public utility plants in the United States, 1919–1926*

[From reports of division of power resources, United States Geological Survey]

Year	Kilowatt-hours generated (millions)			Per cent of total		Fuel consumed, coal and coal equivalent, net tons	Pounds of fuel consumed by fuel stations	
	Total	By water	By fuel[1]	By water	By fuel		Per kilowatt-hour	Per horsepower-hour
1919	38,921	14,606	24,315	37.5	62.5	38,880,000	3.2	2.4
1920	42,555	15,150	27,405	37.1	62.9	41,420,000	3.0	2.2
1921	40,978	14,971	26,006	36.5	63.5	35,240,000	2.7	2.0
1922	47,659	17,206	30,453	36.1	63.9	38,000,000	2.5	1.9
1923	55,975	19,348	36,627	34.8	65.2	43,522,000	2.4	1.8
1924	59,013	19,969	39,044	33.8	66.2	43,130,000	2.2	1.64
1925	66,870	22,356	43,514	33.9	66.1	44,780,000	2.1	1.57
1926	73,791	26,189	47,602	35.5	64.5	45,856,000	1.95	1.46

[1] Includes power generated from wood, which in 1926 amounted to 328,000,000 kilowatt-hours. This is excluded in the calculation of total fuel consumed and average consumption per kilowatt-hour and horsepower-hour given in the last three columns.

TABLE 9.—*Consumption of coal (or coal equivalent of other fuel) by locomotives in road service on class 1 steam railroads, as reported monthly by the Interstate Commerce Commission, 1916–1926*

Year	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Pounds of coal per passenger-train car-mile	Year	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Pounds of coal per passenger-train car-mile
1916	[1] 169	[1] 18.5	1922	163	17.9
1917	[1] 176	[1] 19.4	1923	161	18.1
1918	[1] 174	[1] 19.2	1924	149	17.0
1919	[1] 164	[1] 18.1	1925	140	16.1
1920	[2] 174	[2] 18.8	1926	137	15.8
1921	162	17.7			

[1] From reports of the fuel conservation section of the United States Railroad Administration, prepared under direction of Eugene McAuliffe. These reports gave the consumption per 1,000 gross ton-miles, excluding locomotive and tender, from which the ratio used above has been estimated.
[2] Estimated from the ratio per 1,000 gross ton-miles, excluding locomotive and tender, which bears a practically constant relation to the other.

TABLE 10.—*Fuel economy as indicated by the coal equivalent of the thermal by-products of coking in by-product ovens, 1913–1926*

[By-products included are coke breeze, which is not generally recovered in the manufacture of beehive coke surplus gas not used in heating ovens, tar, and light oil]

Year	Equivalent coal (net tons)	Per cent which this forms of total coal made into coke	Increase in coal equivalent over 1913	Year	Equivalent coal (net tons)	Per cent which this forms of total coal made into coke	Increase in coal equivalent over 1913
1913	2,600,000	3.8		1920	9,316,000	12.2	+6,716,000
1914	2,461,000	4.8	−139,000	1921	[1] 6,461,000	17.4	+3,861,000
1915	3,280,000	5.3	+680,000	1922	9,058,000	16.7	+6,458,000
1916	4,375,000	5.4	+1,775,000	1923	12,417,000	14.7	+9,817,000
1917	5,432,000	6.5	+2,832,000	1924	11,628,000	17.9	+9,028,000
1918	6,785,000	8.0	+4,185,000	1925	13,786,000	18.5	+11,186,000
1919	7,575,000	11.5	+4,975,000	1926	15,394,000	18.6	+12,794,000

[1] Revised figures.

TABLE 11.—*Fuel economy in manufacture of pig iron, 1912–1926*

Year	Pounds coke per gross ton pig iron and ferro-alloys [1]	Yield of coke from coal (per cent)	Pounds coal per gross ton of pig iron and ferro-alloys (column 1 divided by column 2)	Year	Pounds coke per gross ton pig iron and ferro-alloys [1]	Yield of coke from coal (per cent)	Pounds coal per gross ton of pig iron and ferro-alloys (column 1 divided by column 2)
1912	2,436.5	67.1	3,631.1	1920	2,305.6	67.4	3,420.8
1913	2,433.3	66.9	3,637.2	1921	2,200.6	68.0	3,236.2
1914	2,354.4	66.9	3,519.3	1922	2,176.3	68.3	3,186.4
1915	2,252.0	67.2	3,351.2	1923	2,243.3	67.5	3,323.4
1916	2,285.3	66.8	3,421.1	1924	2,212.0	68.1	3,248.2
1917	2,339.7	66.4	3,523.6	1925	2,150.4	68.8	3,125.6
1918	2,375.2	66.4	3,577.1	1926 [2]	2,060.9	68.6	3,004.2
1919	2,310.2	67.4	3,427.6				

[1] According to annual report, American Iron and Steel Institute. No data were published prior to 1912.
[2] Exclusive of coke consumed in the manufacture of ferro-alloys.

TABLE 12.—*Annual supply of energy from mineral fuels and water power in the United States, 1819–1926*

[Figures represent trillions of British thermal units and because of rounding do not always add across exactly. Water power is represented by British thermal units of coal necessary to produce the same amount of power. Figures represent production except those for oil imports, and take no account of changes of stock]

Year	Anthracite	Bituminous coal	Total coal	Domestic oil	Natural gas	Imported oil	Total oil and gas	Total mineral fuels	Water power[1]	Grand total, including water power
1819	[2]	------	[2]	------	------	------	------	[2]	(1)	(1)
1829	4	3	6	------	------	------	------	6	(1)	(1)
1839	27	41	68	------	------	------	------	68	(1)	(1)
1849	109	64	173	------	------	------	------	173	(1)	(1)
1859	262	158	419	[2]	------	------	------	419	(1)	(1)
1869	464	415	879	25	------	------	25	904	(1)	(1)
1879	822	993	1,815	119	[2]	------	119	1,934	(1)	(1)
1889	1,239	2,507	3,746	211	[3] 268	------	479	4,225	91	4,316
1899	1,643	5,065	6,708	342	[3] 240	------	582	7,291	135	7,426
1909	2,205	9,949	12,155	1,099	517	[4]	1,616	13,771	411	14,182
1913	2,490	12,535	15,025	1,491	626	102	2,219	17,243	588	17,831
1918	2,688	15,180	17,868	2,136	775	226	3,137	21,005	837	21,842
1919	2,396	12,206	14,602	2,270	802	317	3,389	17,991	892	18,883
1920	2,437	14,899	17,336	2,658	858	637	4,153	21,489	971	22,460
1921	2,461	10,897	13,358	2,833	712	752	4,297	17,655	908	18,563
1922	1,487	11,063	12,551	3,345	820	764	4,929	17,480	1,024	18,504
1923	2,539	14,791	17,330	4,394	1,082	492	5,968	23,298	1,136	24,434
1924	2,392	12,672	15,064	4,284	1,227	467	5,978	21,042	1,167	22,209
1925	1,681	13,625	15,306	4,582	1,278	371	6,231	21,537	1,290	22,827
1926	2,297	15,022	17,319	4,625	1,411	362	6,398	23,717	1,492	25,209

[1] No figures for water power are available before 1889. The fuel equivalent for water power is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 per cent for manufactures and mines and of 40 per cent for public utilities, and assuming that the theoretical thermal equivalent of 1 horsepower-hour (2,547 British thermal units) is 7 per cent of the British thermal units that would have been consumed in generating 1 horsepower-hour from fuels in practice. For 1919 to 1926, however, actual reports of the horsepower-hours produced by water in electric utility plants, as recorded by the U. S. Geological Survey, have been used.

[2] Less than 0.5.

[3] Based on the amount of coal displaced by gas, as estimated by the gas companies at the time.

[4] Imports negligible before 1913.

PRODUCTION SUMMARIES, BY STATES

TABLE 13.—*Comparison of bituminous coal produced, by States, 1913, 1923, 1925, and 1926 (see also fig. 11)*

State	Production (net tons)				Per cent of increase or decrease		
	1913	1923	1925	1926	1913–1926	1923–1926	1925–1926
Alabama	17,678,522	20,457,649	20,004,395	21,000,962	+18.8	+2.7	+5.0
Arkansas	2,234,107	1,296,892	1,220,039	1,459,017	−34.7	+12.5	+19.6
Colorado	9,232,510	10,346,218	10,310,551	10,637,225	+15.2	+2.8	+3.2
Georgia	255,626	75,620	66,174	59,869	−76.6	−20.8	−9.5
Illinois	61,618,744	79,310,075	66,909,359	69,366,923	+12.6	−12.5	+3.7
Indiana	17,165,671	26,229,099	21,224,966	23,186,006	+35.1	−11.6	+9.2
Iowa	7,525,936	5,710,735	4,714,843	4,625,487	−38.5	−19.0	−1.9
Kansas	7,202,210	4,443,149	4,524,251	4,416,480	−38.7	−.6	−2.4
Kentucky	19,616,600	44,777,317	55,068,670	62,924,462	+220.8	+40.5	+14.3
Maryland	4,779,839	2,285,926	2,694,572	3,078,353	−35.6	+34.7	+14.2
Michigan	1,231,786	1,172,075	808,233	686,707	−44.3	−41.4	−15.0
Missouri	4,318,125	3,403,151	2,694,215	3,008,495	−30.3	−11.6	+11.7
Montana	3,240,973	3,147,678	3,043,686	2,797,760	−13.7	−11.1	−8.1
New Mexico	3,708,806	2,915,173	2,556,851	2,817,923	−24.0	−3.3	+10.2
North Dakota	495,320	1,385,400	1,324,620	1,370,244	+176.6	−1.1	+3.4
Ohio	36,200,527	40,546,443	28,034,112	27,872,488	−23.0	−31.3	−.6
Oklahoma	4,165,770	2,885,038	2,325,840	2,842,673	−31.8	−1.5	+22.2
Pennsylvania	173,781,217	171,879,913	136,928,019	153,041,638	−11.9	−11.0	+11.8
South Dakota	10,540	10,379	14,447	14,428	+36.9	+39.0	−.1
Tennessee	6,860,184	6,040,268	5,454,011	5,788,741	−15.6	−4.2	+6.1
Texas	2,429,144	1,187,329	1,008,375	1,091,158	−55.1	−8.1	+8.2
Utah	3,254,828	4,720,217	4,690,342	4,373,793	+34.4	−7.3	−6.7
Virginia	8,828,068	11,761,643	12,799,443	14,133,386	+60.1	+20.2	+10.4
Washington	3,877,891	2,926,392	2,537,890	2,586,568	−33.3	−11.6	+1.9
West Virginia	71,254,136	107,899,941	122,380,959	143,509,340	+101.4	+33.0	+17.3
Wyoming	7,393,066	7,575,031	6,553,232	6,512,288	−11.9	−14.0	−.6
Other States	75,151	175,911	160,646	164,571	+119.0	−6.4	+2.4
	478,435,297	564,564,662	520,052,741	573,366,985	+19.8	+1.6	+10.3

PRODUCTION, BY FIELDS

Many requests are received for information on production by trade fields as distinct from States and counties. In Table 14 the operators' reports to the Bureau of Mines have been retabulated according to the 92 fields into which the United States Coal Commission grouped the bituminous coal mines. Corresponding figures for 1920 and 1921 will be found in Coal in 1923, pages 534 and 535; for 1922 and 1924 in Coal in 1924, pages 471 and 472; and for 1925 in Coal in 1925, pages 417 and 418.[29]

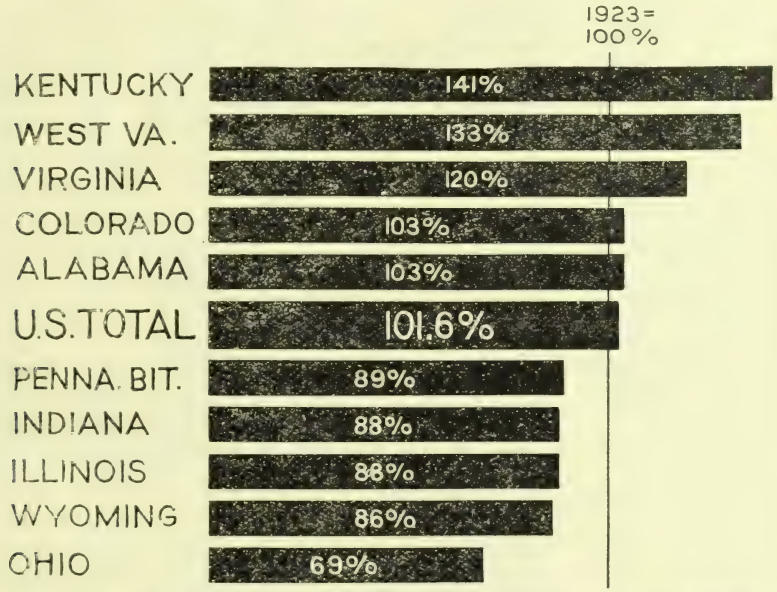

FIGURE 11.—How production of bituminous coal in 1926 compared with 1923 in the 10 leading States. Figures represent the per cent that the production in 1926 formed of that in 1923

The commission's grouping of the fields was made under the direction of C. E. Lesher and R. A. Walter, primarily with a view to its studies of cost of production. The fields are accurately delimited by metes and bounds on pages 2034 to 2052 of the commission's report. Because all the fields adopted did not coincide with generally accepted trade districts they were designated by number rather than by name. For the convenience of the reader of Table 14, however, the trade name most nearly corresponding to the boundaries established by the commission is also listed.

[29] Data on production by fields in 1917 and 1918 are given in Coal in 1918, part A, p. 705. The grouping of the fields there used is the one adopted for administrative purposes by the United States Fuel Administration and is explained on p. 114 of Part I of the Report of the Distribution Division of the Fuel Administration. This grouping differs from that of the United States Coal Commission.

TABLE 14.—*Bituminous coal produced and number of mines active in the several fields adopted by the United States Coal Commission, 1923 and 1926*

[The definitions of these fields are given in detail on pp. 2034–2052, Part IV, of the Report of the United States Coal Commission]

Coal Commission field No.	State	General name of field	1923		1926	
			Number of mines	Production (net tons)	Number of mines	Production (net tons)
1	Pennsylvania	Pittsburgh	452	42,209,000	267	29,575,000
2	do	Connellsville	312	37,882,000	210	40,010,000
3	do	Westmoreland-Ligonier	171	14,563,000	128	14,777,000
4a, b	do	Freeport (thick and thin)	123	12,338,000	102	9,100,000
5	do	Butler-Mercer	110	2,587,000	80	2,566,000
6	do	Blossburg	20	496,000	16	236,000
7	do	Broad Top	63	1,430,000	46	1,546,000
8	do	Somerset	232	5,772,000	159	7,144,000
9a	do	Central Pennsylvania, western	1,385	54,364,000	101	3,210,000
9b	do	Central Pennsylvania, middle			184	9,603,000
9c	do	Central Pennsylvania, eastern			670	35,275,000
10	Maryland-West Virginia	Maryland-Potomac	159	3,890,000	136	4,860,000
11	West Virginia	Fairmont	309	22,883,000	217	25,955,000
12	Ohio-West Virginia	Panhandle-Pittsburgh No. 8	233	25,529,000	175	21,759,000
13	do	Pomeroy	41	1,309,000	27	978,000
14	West Virginia	Putnam County	10	345,000	2	346,000
15	Kentucky-West Virginia	Kenova	38	2,103,000	26	3,299,000
16	do	Thacker	89	6,149,000	67	8,967,000
17	West Virginia	Tug River	87	4,555,000	69	7,915,000
18	Virginia-West Virginia	Pocahontas	107	16,481,000	92	21,748,000
19	West Virginia	Winding Gulf	78	7,228,000	70	11,049,000
20	do	New River	145	8,810,000	119	12,502,000
21	do	Kanawha	285	12,741,000	174	18,299,000
22	do	Coal River	29	1,397,000	21	2,192,000
23	do	Logan	155	12,831,000	109	20,627,000
24a	do	Coal and Coke	39	1,158,000	16	993,000
24b	do	Preston County	58	1,937,000	47	1,861,000
24c	do	Taylor County, Junior, Philippi, and Gauley	176	6,140,000	123	6,510,000
25	Virginia	Southwestern Virginia	123	8,148,000	81	9,807,000
26	do	Clinch Valley	34	2,464,000	21	2,610,000
27	do	Upper New River	[1] 8	[1] 217,000	4	264,000
28	do	Richmond Basin	(1)	(1)		
29	Ohio	Massillon-Palmyra-Lisbon	90	2,815,000	79	1,977,000
30	do	Coshocton-Goshen	155	3,174,000	118	1,760,000
31	do	Cambridge	55	4,780,000	42	1,882,000
32	do	Crooksville	60	1,015,000	38	653,000
33	do	Hocking	241	7,517,000	146	4,904,000
34	do	Jackson and Ironton	89	610,000	56	335,000
36	Kentucky	Northeast Kentucky	225	9,602,000	177	14,678,000
37	do	Hazard	128	6,660,000	91	8,775,000
38	do	Harlan	75	8,752,000	74	13,160,000
39	Kentucky-Tennessee	Southern Appalachian	221	6,765,000	133	7,362,000
40	do	Jellico	55	1,003,000	20	856,000
41	Kentucky	Western Kentucky	172	10,890,000	152	15,464,000
42	Tennessee	Rockwood-Soddy	89	2,563,000	37	2,205,000
43	do	Fentress	13	541,000	7	754,000
44	Alabama	Big Seam Group	45	5,954,000	46	6,602,000
45	Alabama-Georgia	Cahaba Group	109	5,846,000	99	6,076,000
46	Alabama	Pratt Group	137	8,696,000	83	8,383,000
47	Indiana	Indiana	272	25,793,000	184	22,912,000
48	do	Brazil Block	29	345,000	21	274,000
49	Illinois	Northern Illinois	60	2,334,000	46	1,747,000
50	do	Fulton-Peoria	119	4,190,000	154	3,571,000
51	do	Danville	32	4,178,000	37	3,104,000
52	do	Central Illinois	108	25,205,000	81	20,983,000
53	do	Belleville	106	10,193,000	85	7,305,000
54	do	Murphysboro	10	557,000	8	556,000
55	do	Southern Illinois	140	32,595,000	104	32,101,000
56	Michigan	Michigan	13	1,172,000	9	687,000
57	Arkansas	Sebastian	54	899,000	45	945,000
58	do	Excelsior-Logan	22	112,000	30	251,000
59	do	Arkansas (anthracite)	18	222,000	24	263,000
60	Colorado	Colorado (domestic)	145	4,430,000	141	4,449,000
61	do	Trinidad	44	3,182,000	38	3,300,000
62	do	Northern Colorado	47	2,715,000	42	2,888,000
63	Iowa	Marion-Monroe-Polk	89	4,485,000	125	3,694,000
64	do	Appanoose	62	1,217,000	68	932,000

[1] Upper New River field includes Richmond Basin field (No. 28) in 1923.

TABLE 14.—*Bituminous coal produced and number of mines active in the several fields adopted by the United States Coal Commission, 1923 and 1926*—Contd.

[The definitions of these fields are given in detail on pp. 2034-2052, Part IV, of the Report of the United States Coal Commission]

Coal Commission field No.	State	General name of field	1923		1926	
			Number of mines	Production (net tons)	Number of mines	Production (net tons)
65	Kansas	Pittsburg	192	4,135,000	218	4,157,000
66	do	Lightning Creek				
67	do	Osage	27	115,000	32	143,000
68	do	Leavenworth [2]	4	137,000	2	116,000
69	Missouri	Southern Missouri	[3] 79	[3] 2,114,000	86	1,997,000
70	do	Lafayette	69	1,141,000	81	1,011,000
71	do	Grundy	(2)	(2)		
72	do	Platte	(2)	(2)	(2)	(2)
73	Montana	Montana	48	3,144,000	45	2,798,000
74	New Mexico	Gallup	13	939,000	[4] 16	[4] 995,000
75	do	Anthracite	11	248,000	8	262,000
76	do	Raton	15	1,678,000	11	1,561,000
76a	do	Monero	3	33,000	(4)	(4)
77	North Dakota	Southern North Dakota	72	910,000	95	890,000
78	do	Northern North Dakota	50	447,000	55	480,000
79	Oklahoma	McAlester Vein	25	640,000	22	486,000
80	do	Oklahoma, eastern	90	2,200,000	93	2,357,000
81	Texas	Texas (bituminous)	10	175,000	7	170,000
82	do	Texas (lignite)	34	1,012,000	25	921,000
83	Utah	Utah	37	4,720,000	38	4,374,000
84	Washington	Kittitas County	12	1,358,000	8	1,078,000
85	do	Pierce-King (bituminous)	16	605,000	22	1,126,000
86	do	Lewis	28	963,000	21	383,000
87	Wyoming	Wyoming	62	7,559,000	61	6,512,000
88	South Dakota	South Dakota	15	10,000	24	14,000
89	Oregon	Oregon	(5)	(5)	(5)	(5)
90	California [5]	California [5]	5	20,000	5	19,000
91	Nevada	Nevada				
92	North Carolina	North Carolina	2	36,000	2	58,000
	Unclassified		12	120,000	7	88,000
			9,331	563,422,000	7,177	573,367,000

[2] Leavenworth field, Kansas, includes Platte field, Missouri (No. 72).
[3] Southern Missouri field includes Grundy field (No. 71) in 1923.
[4] Gallup field includes Monero field (No. 76a) in 1926.
[5] California includes Idaho and Oregon.

PRODUCTION, BY WEEKS AND MONTHS

The following tables summarize the statistics of the weekly and monthly production of anthracite and bituminous coal that are first published in the Bureau of Mines weekly coal reports. The figures given are estimates based upon daily and weekly reports of cars of coal and beehive coke loaded by the principal railroads and of shipments over the Monongahela, Allegheny, Ohio, and Kanawha Rivers. The estimates are afterwards revised to agree with the results of the annual statistical reports from the producers of coal; therefore, the figures here given differ slightly from the estimates originally issued in the weekly reports.

If production in February, with 28 days, is compared to that in January, with 31 days, a downward drop is often seen, which may give a mistaken impression as to the real trend. A better indication is given by the average production per working day, and it is the practice of the Bureau of Mines in tables of monthly or weekly coal production to show the average per working day as well as the total for the period. (Fig. 1.) Christmas and Fourth of July are universally observed at the mines. A number of other holidays are observed in some districts but not in others. New Year's Day is very generally observed, but in 1926 enough mines continued at work on that day

so that over the country, as a whole, the day counted for three-tenths of a normal working day. February 22, on the other hand, is little observed as a holiday, and in 1926 counted for nine-tenths of a working day. Table 17 shows the allowances made in the bureau's records for holidays at the bituminous mines in the last seven years. These allowances are made in the light of the daily reports of cars of coal loaded, collected by the American Railway Association. Loadings on the holiday are compared with those on the corresponding day of the weeks immediately preceding and following, and the degree of holiday observance is computed accordingly. After allowing for the observance of holidays the weighted average potential working year for the country, as a whole, was 307.6 days in 1926.

The working year in the anthracite region is somewhat less than the average for the bituminous coal industry. The region is completely unionized, and the union holidays are therefore observed by practically all mines. In addition to Eight-hour Day (April 1) and Labor Day, the anthracite miners celebrate Mitchell Day (October 29) in memory of the ending of the famous strike of 1902. Other holidays not observed in the nonunion bituminous fields, such as Memorial Day, Thanksgiving, and Armistice Day, are now generally celebrated in the anthracite region. (See footnote to Table 20.) In consequence, the theoretical working year for the anthracite mines is 304 days, a figure that makes no allowance for church holy days, many of which are so generally observed as to decrease production seriously.

The statistics of weekly output of anthracite are estimated from the records of cars of anthracite loaded by the nine railroads that serve the region. The weekly figures have been adjusted to the annual total ascertained by direct canvass of the operators themselves.

TABLE 15.—*Estimated weekly production of bituminous coal in 1926*

Week ended—	Production (net tons)	Number of working days	Average production per working day (net tons)	Week ended—	Production (net tons)	Number of working days	Average production per working day (net tons)
Jan. 2	[1] 2,545,000	[1] 1.3	[2] 2,013,000	July 17	10,030,000	6	1,672,000
9	12,920,000	6	2,153,000	24	10,064,000	6	1,677,000
16	12,957,000	6	2,160,000	31	10,450,000	6	1,742,000
23	12,325,000	6	2,054,000	Aug. 7	10,064,000	6	1,677,000
30	12,456,000	6	2,076,000	14	10,538,000	6	1,756,000
Feb. 6	12,063,000	6	2,010,000	21	10,443,000	6	1,741,000
13	11,909,000	6	1,985,000	28	11,122,000	6	1,854,000
20	11,411,000	6	1,902,000	Sept. 4	10,921,000	6	1,820,000
27	10,797,000	5.9	1,830,000	11	10,170,000	5.4	1,883,000
Mar. 6	10,371,000	6	1,729,000	18	11,350,000	6	1,892,000
13	10,599,000	6	1,767,000	25	11,617,000	6	1,936,000
20	10,176,000	6	1,696,000	Oct. 2	11,906,000	6	1,984,000
27	9,544,000	6	1,591,000	9	12,258,000	6	2,043,000
Apr. 3	8,963,000	5.7	1,572,000	16	12,281,000	6	2,047,000
10	9,340,000	6	1,557,000	23	12,604,000	6	2,101,000
17	9,227,000	6	1,538,000	30	13,371,000	6	2,229,000
24	9,192,000	6	1,532,000	Nov. 6	12,993,000	5.7	2,279,000
May 1	9,047,000	6	1,508,000	13	13,690,000	5.7	2,402,000
8	8,962,000	6	1,494,000	20	14,160,000	6	2,360,000
15	9,220,000	6	1,537,000	27	13,299,000	5.5	2,418,000
22	9,203,000	6	1,534,000	Dec. 4	14,551,000	6	2,425,000
29	9,601,000	6	1,600,000	11	13,970,000	6	2,328,000
June 5	8,586,000	5.4	1,590,000	18	13,350,000	6	2,225,000
12	9,542,000	6	1,590,000	25	10,397,000	5	2,079,000
19	9,422,000	6	1,570,000	Jan. 1, 1927	[1] 9,984,000	[1] 5	[2] 2,021,000
26	9,762,000	6	1,627,000				
July 3	9,409,000	6	1,568,000		573,367,000	307.6	1,864,000
10	8,235,000	5	1,647,000				

[1] Figures represent the output and the number of working days in that part of the week included in the calendar year shown. Figures of total production for these weeks are as follows: Jan. 2, 1926, 10,670,000 tons; Jan. 1, 1927, 10,711,000 tons.

[2] Average daily production for the entire week and not for the working days that fell in the calendar year shown.

TABLE 16.—*Estimated weekly production of anthracite in 1926*

Week ended—	Production (net tons)	Number of working days	Average production per working day (net tons)	Week ended—	Production (net tons)	Number of working days	Average production per working day (net tons)
Jan. 2	[1] 8,000	[1] 1	[2] 5,600	July 17	1,966,000	6	328,000
9	47,000	6	7,800	24	1,927,000	6	321,000
16	37,000	6	6,200	31	2,051,000	6	342,000
23	47,000	6	7,800	Aug. 7	1,831,000	6	305,000
30	34,000	6	5,700	14	1,924,000	6	321,000
Feb. 6	27,000	6	4,500	21	1,770,000	6	295,000
13	35,000	6	5,800	28	1,986,000	6	331,000
20	405,000	6	68,000	Sept. 4	1,938,000	6	323,000
27	1,598,000	6	266,000	11	1,679,000	5	336,000
Mar. 6	1,777,000	6	296,000	18	1,990,000	6	332,000
13	1,953,000	6	326,000	25	2,045,000	6	341,000
20	1,950,000	6	325,000	Oct. 2	2,039,000	6	340,000
27	1,978,000	6	330,000	9	2,055,000	6	343,000
Apr. 3	1,539,000	5	308,000	16	2,079,000	6	347,000
10	1,781,000	6	297,000	23	2,048,000	6	341,000
17	2,072,000	6	345,000	30	1,793,000	5	359,000
24	2,073,000	6	346,000	Nov. 6	1,555,000	6	259,000
May 1	2,084,000	6	347,000	13	1,776,000	5	355,000
8	1,972,000	6	329,000	20	1,748,000	6	291,000
15	1,891,000	6	315,000	27	1,627,000	5	325,000
22	1,738,000	6	290,000	Dec. 4	1,984,000	6	331,000
29	2,075,000	6	346,000	11	1,795,000	6	299,000
June 5	1,667,000	5	333,000	18	1,782,000	6	297,000
12	2,069,000	6	345,000	25	1,493,000	5	299,000
19	2,019,000	6	337,000	Jan. 1, 1927	[1] 1,115,000	[1] 5	[2] 224,000
26	2,073,000	6	346,000				
July 3	1,957,000	6	326,000		84,437,000	304	278,000
10	1,535,000	5	307,000				

[1] Figures represent the output and the number of working days in that part of the week included in the calendar year shown. Figures of total production for these weeks are as follows: Jan. 2, 1926, 28,000 tons; Jan. 1, 1927, 1,121,000 tons.

[2] Average daily production for the entire week and not for the working days that fell in the calendar year shown.

TABLE 17.—*Holidays commonly recognized in the bituminous coal fields and the average fraction of a working day for the country as a whole that each holiday represented, 1920–1926*

	Average fraction of full working day						
	1920	1921	1922	1923	1924	1925	1926
January: New Year's Day	0.3	0.2	0.2	0.3	0.2	0.3	0.3
February: Washington's Birthday	[1]	[1]	[1]	.9	.8	.9	.9
April: Eight-hour Day (Apr. 1)	.3	.3	.3	.4	.5	.6	.7
May: Memorial Day	.5	.2	.8	.3	.4	.4	.4
July: Independence Day							
September: Labor Day	.3	.3	.3	.3	.3	.4	.4
November:							
General election	.5				.4		.7
Armistice Day	.7	.5	.5	.4	.6	.7	.7
Thanksgiving Day	.3	.3	.2	.1	.2	.3	.5
December: Christmas Day							

[1] Data for weighting not available.

TABLE 18.—*Estimated monthly production of bituminous coal and average production per working day, 1924–1926,*[1] *in thousands of net tons*

Month	1924		1925		1926	
	Total	Daily average	Total	Daily average	Total	Daily average
January	52,507	2,004	51,640	1,963	53,205	2,103
February	47,302	1,907	38,770	1,622	46,180	1,932
March	41,288	1,588	37,416	1,439	45,744	1,694
April	30,429	1,193	33,514	1,309	39,738	1,546
May	32,276	1,223	35,276	1,389	38,727	1,525
June	31,458	1,258	36,960	1,422	41,635	1,601
July	33,346	1,283	39,362	1,514	43,102	1,658
August	35,923	1,382	44,633	1,717	45,957	1,767
September	42,376	1,675	46,556	1,833	48,559	1,912
October	48,414	1,793	52,907	1,960	54,127	2,082
November	42,102	1,815	50,497	2,131	59,213	2,378
December	46,266	1,779	52,522	2,020	57,180	2,199
	483,687	1,573	520,053	1,692	573,367	1,864

[1] Monthly statistics from 1905 to 1923 will be found in Coal in 1922, pp. 464–465, and in Coal in 1923, pp. 541–542.

TABLE 19.—*Estimated monthly production of coal, by States, in 1926, in thousands of net tons*

State	January	February	March	April	May	June	July
Alabama	1,993	1,692	1,750	1,602	1,460	1,542	1,626
Arkansas	139	99	100	93	71	88	104
Colorado	1,085	754	795	811	623	595	670
Illinois	7,200	5,399	5,868	4,808	3,857	4,127	4,383
Indiana	2,393	1,759	2,010	1,707	1,377	1,347	1,416
Iowa	464	375	384	345	305	303	306
Kansas	437	326	327	311	253	265	308
Kentucky:							
Eastern	4,154	3,614	3,790	3,451	3,654	3,964	4,083
Western	1,649	1,167	1,271	1,020	877	1,055	1,056
Maryland	294	267	237	216	199	228	234
Michigan	82	62	74	56	30	21	24
Missouri	316	225	231	211	160	177	201
Montana	265	226	213	165	147	151	160
New Mexico	278	215	223	218	200	211	211
North Dakota	123	115	104	72	66	71	72
Ohio	2,630	2,428	2,355	1,908	1,714	1,738	1,762
Oklahoma	278	212	208	218	180	177	205
Pennsylvania, bituminous	14,190	13,537	12,419	10,566	10,388	10,884	11,420
Tennessee	533	490	492	432	398	422	447
Texas	87	70	70	70	69	73	85
Utah	451	302	276	282	304	386	326
Virginia	1,235	1,131	1,157	1,035	1,010	1,138	1,169
Washington	224	204	212	171	157	171	167
West Virginia	12,008	11,000	10,615	9,508	10,853	12,127	12,245
Wyoming	677	492	542	441	356	353	400
Other States	20	19	21	21	19	21	22
Total bituminous	53,205	46,180	45,744	39,738	38,727	41,635	43,102
Pennsylvania anthracite	172	2,069	8,732	8,163	8,001	8,878	8,371
Grand total	53,377	48,249	54,476	47,901	46,728	50,513	51,473

TABLE 19.—*Estimated monthly production of coal, by States, in 1926, in thousands of net tons*—Continued

State	August	September	October	November	December	Year
Alabama	1,672	1,741	1,886	2,067	1,970	21,001
Arkansas	109	127	165	185	179	1,459
Colorado	782	946	1,064	1,187	1,325	10,637
Illinois	4,927	5,392	6,648	8,114	8,644	69,367
Indiana	1,756	1,907	2,164	2,649	2,701	23,186
Iowa	302	359	443	504	535	4,625
Kansas	318	380	469	511	511	4,416
Kentucky:						
Eastern	4,160	4,185	4,161	4,315	3,929	47,460
Western	1,233	1,398	1,554	1,599	1,585	15,464
Maryland	250	260	290	305	298	3,078
Michigan	45	52	77	85	79	687
Missouri	215	254	319	349	350	3,008
Montana	206	261	332	339	333	2,798
New Mexico	210	229	262	279	282	2,818
North Dakota	84	119	190	188	166	1,370
Ohio	1,966	2,273	2,843	3,199	3,056	27,872
Oklahoma	204	244	286	306	325	2,843
Pennsylvania, bituminous	12,155	12,672	14,264	15,405	15,142	153,042
Tennessee	468	478	513	587	529	5,789
Texas	92	107	122	126	120	1,091
Utah	369	373	426	419	460	4,374
Virginia	1,180	1,206	1,280	1,359	1,233	14,133
Washington	194	238	289	284	276	2,587
West Virginia	12,577	12,742	13,379	14,088	12,367	143,509
Wyoming	463	600	679	742	767	6,512
Other States	20	16	22	22	18	241
Total bituminous	45,957	48,559	54,127	59,213	57,180	573,367
Pennsylvania anthracite	8,171	8,388	8,617	7,397	7,478	84,437
Grand total	54,128	56,947	62,744	66,610	64,658	657,804

TABLE 20.—*Estimated monthly production of anthracite and average production per working day,*[1] *1921–1926, in thousands of net tons*

Month	1921		1922		1923		1924		1925		1926	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	7,681	307	6,566	263	8,521	328	7,724	297	7,234	278	172	7
February	7,983	333	7,096	296	7,602	317	7,428	297	7,003	292	2,069	86
March	7,677	284	9,181	340	9,175	340	7,908	304	6,886	265	8,732	323
April	7,985	319	27	1	7,885	329	6,639	265	7,292	292	8,163	327
May	7,752	310	36	1	8,384	322	7,549	290	7,938	318	8,001	320
June	8,071	310	86	3	8,474	326	7,509	300	7,616	293	8,878	341
July	7,309	292	118	5	8,136	325	7,584	292	8,334	321	8,371	322
August	7,459	276	164	6	8,672	321	6,906	266	9,014	347	8,171	314
September	7,385	295	5,075	203	2,853	119	7,408	296	52	2	8,388	336
October	7,858	314	8,896	356	8,532	328	7,479	288	69	3	8,617	345
November	7,110	296	8,695	362	7,575	316	6,604	287	153	7	7,397	308
December	6,203	239	8,743	350	7,530	301	7,189	277	226	9	7,478	288
	90,473	298	54,683	180	93,339	307	87,927	288	61,817	203	84,437	278

[1] Production up to 1923 was estimated from monthly shipments as reported by the Anthracite Bureau of Information, since 1923 from weekly car loadings as reported by the American Railway Association, and includes mine fuel, coal sold locally, dredge coal, and the output of the Bernice Basin in Sullivan County. In computing the average rates per working day New Year's, Eight-hour Day (Apr. 1), Memorial Day, Independence Day, Labor Day, Mitchell Day (Oct. 29), Thanksgiving Day, Christmas Day, and, since the war, Armistice Day, have been counted as holidays. No allowance, however, has been made for church holy days which are observed by many of the miners. Monthly statistics from 1905 to 1920 will be found in Coal in 1925, pp. 427–428.

CONSUMER-OWNED MINES

How much of the total output of bituminous coal is produced by mines owned by or affiliated with consuming interests has long been a matter of speculation. The following summary of the operations of such "captive mines," as they are called in the trade, is abstracted from a detailed report by two members of the bureau, to be published elsewhere.[30]

The data are based on replies to a schedule sent in 1925 to all operators producing over 2,000 tons. The returns were supplemented by information from the local associations of coal operators, many of which were found to have complete records for their respective districts. The lists thus obtained are believed to include all mines of importance owned by consumers.

In this way a detailed analysis of the operations of captive mines was obtained, showing the tonnage produced, the total value of the product and average value per ton, the tonnage used by the consumer owner, the surplus sold commercially, the number of employees, and the time worked, all for the calendar year 1924. (Tables 21 to 25.) The detailed record for this typical year was then supplemented by a tabulation of the number and total production of the captive mines in operation in each year from 1913 to 1926. (Tables 26 and 27.)

SUMMARY OF "CAPTIVE" OPERATIONS IN 1924

The principal statistical facts of consumer-owned operations in 1924 have been summarized in Table 21. In that year there were 649 consumer-owned bituminous coal mines in operation in the United States. The production of this group of mines amounted to 111,654,583 net tons, or 23.1 per cent of the total output of bituminous coal during that year. Of this, 96,977,144 tons were delivered to the consumer owner and 1,913,515 tons were required for mine fuel, while the remainder, 12,763,924 tons, was disposed of either by local sales or in the open market in competition with commercial coal.

The deliveries to the consumer owner thus absorbed 86.9 per cent of the output of the group as a whole. In some States, however, particularly in the southern Rocky Mountains, the owners required only a small part of the total production of their mines and therefore had a relatively large surplus for sale. Thus, in New Mexico only 20.4 per cent of the production of the mines classed as "captive" was consumed by the owners, while in Utah the proportion was 33.5 per cent, and in Colorado 53.3 per cent. It is interesting to note that while only 23.1 per cent of the total output of bituminous coal was contributed by captive mines, the tonnage produced by these mines was valued at more than 25 per cent of the total amount realized by all producers of soft coal. Of equal interest is the fact that the number of men employed in these mines was considerably less than their proportionate share, being only 20.8 per cent of the total number of men engaged in the bituminous industry during 1924. The average number of days worked in the consumer-owned mines was 194 as compared with 165 days in commercial mines. (See also Table 24.)

[30] Rogers, H. O., and Tryon, F. G., Consumer-Owned Coal Mines in the United States.

LOCATION OF CONSUMER-OWNED MINES

The consumer-owned mines east of the Mississippi are concentrated mainly about the highly industrialized sections. The acquisition of these mines grew largely out of the demand of certain industrial enterprises for a dependable supply of special quality coal. This is apparent by the large percentage of captive tonnage coming from the steel-producing centers of Pennsylvania and Alabama. In the Western States a different situation prevails; the captive mines in that territory belong chiefly to the railroads. In the early days of railroad expansion the carriers obtained coal lands along with their other rights, and these properties were developed to provide fuel for their own requirements. Of course, there are industrially owned mines in the West, particularly in Colorado, New Mexico, and Utah, but the bulk of the consumer-owned output in the Western States comes from railroad mines.

Pennsylvania ranks first as a producer of consumer-owned coal. The 215 captive mines operating in this State in 1924 produced 41,618,722 tons of coal, or 31.9 per cent of the State's bituminous output. Illinois, with 16,274,898 tons, came next in 1924 and following in order of importance were West Virginia, Alabama, and Kentucky. In number of consumer-owned mines as distinct from tonnage, Ohio, with 95 mines, ranked next to Pennsylvania, but the majority of these were small operations belonging to brick and tile works.

TABLE 21.—*Operations of consumer-owned bituminous coal mines, by States, in 1924*

State	Number of mines	Deliveries to consumer owners (net tons)	Per cent of output used by consumer owner	Total production, including commercial sales (net tons)					Total value	Average number of men employed	Average number of days worked	Total production of all mines (net tons)	Per cent of total produced by "captive mines"
				Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity					
Alabama	37	8,787,246	96.1	8,690,767	237,743	89,293	126,867	9,144,670	$20,995,792	11,182	250	19,130,184	47.8
Arkansas	4	116,308	87.0	128,986	442	4,261		133,689	429,036	363	99	1,451,503	9.2
Colorado	28	1,937,793	53.3	3,260,270	154,857	85,708	133,329	3,634,164	12,051,864	4,060	200	10,444,098	34.8
Georgia	1	72,947	100.0	56,097	611	1,839	14,400	72,947	267,063	139	250	74,947	97.3
Illinois	40	13,602,878	83.6	15,623,673	423,516	227,709		16,274,898	37,466,428	19,375	163	68,323,281	23.8
Indiana	9	480,551	51.2	874,475	42,841	21,761		939,077	2,157,443	1,276	144	21,480,213	4.4
Iowa	5	869,423	99.5	840,503	14,466	18,885		873,854	2,848,903	1,188	235	5,468,450	15.9
Kansas	10	828,632	87.8	905,960	14,654	23,079		943,693	2,920,248	1,392	201	4,247,753	22.2
Kentucky	40	7,639,876	89.8	8,133,375	130,682	93,854	146,794	8,504,705	18,262,131	9,546	181	45,147,204	18.8
Maryland	2	18,198	100.0	17,390	808			18,198	58,118	86	66	2,133,703	.9
Missouri	4	187,343	87.0	206,487	3,008	5,842		215,337	795,024	637	136	2,480,880	8.7
Montana	11	1,741,982	83.9	1,956,121	48,752	71,035		2,075,908	5,933,591	1,884	191	2,905,365	71.5
New Mexico	5	280,998	20.4	1,205,139	12,194	26,738	136,212	1,380,283	4,865,359	2,004	232	2,786,063	79.5
North Dakota	5	46,983	64.9	40,036	31,240	1,149		72,425	163,237	70	190	1,200,527	6.0
Ohio	95	4,510,454	83.6	4,027,210	1,298,028	68,004		5,393,242	12,046,509	6,133	189	30,473,007	17.7
Oklahoma	5	261,700	100.0	243,780	13,028	4,892		261,700	955,578	944	98	2,329,615	11.2
Pennsylvania	215	39,131,145	94.0	31,385,471	2,891,397	774,082	6,567,772	41,618,722	100,488,478	46,164	205	130,633,773	31.9
Tennessee	13	789,992	88.7	602,754	20,653	45,921	220,890	890,218	1,964,852	2,411	170	4,556,555	19.5
Texas	2	38,542	100.0	38,542				38,542	134,460	260	82	1,147,011	3.4
Utah	10	654,701	33.5	1,619,388	18,034	50,028	268,808	1,956,258	5,634,440	2,171	170	4,488,157	43.6
Virginia	4	172,498	31.1	412,046	21,366	4,000	117,407	554,819	1,101,301	829	209	10,693,464	5.2
Washington	9	1,106,715	98.8	1,047,095	30,658	24,887	17,341	1,119,981	4,009,206	1,670	165	2,653,667	42.2
West Virginia	75	10,766,678	87.9	10,999,333	1,006,474	151,707	85,610	12,243,124	26,047,004	11,929	188	101,662,897	12.0
Wyoming	20	2,933,561	89.1	3,146,549	28,739	118,841		3,294,129	9,262,771	3,204	186	6,757,468	48.7
	649	96,977,144	86.9	95,461,447	6,444,191	1,913,515	7,835,130	111,654,583	270,858,836	128,917	194	482,669,765	23.1

CLASSIFICATION BY BUSINESS OF CONSUMER OWNER

Table 22 groups the captive production of 1924 according to the business of the consumer owner. Details by States appear in Table 23.

In general, it may be said that industries in which the cost of fuel forms only a small part of the total operating expense and which do not need a particular grade of coal have not the same incentive for operating coal mines as industries in which the cost of fuel is a major item and which require coal of special quality. Again, it is questionable whether highly seasonal industries can economically operate a mine. Off-season storage adds materially to the cost of fuel, and the disposal of tonnage produced during the slack period would present serious difficulty; nor could the mine be closed without involving large losses, as full-time operation is desirable in coal mining because a large part of the overhead expenses continue when the mine is idle. Furthermore, steam coal users in most sections of the country enjoy a wide latitude of selection; any of a number of coals can be successfully utilized, and under normal market conditions there is little doubt that such consumers can purchase their coal quite as cheaply as they can produce it themselves.

TABLE 22.—*Production of captive bituminous coal mines, grouped by business of consumer owner, in 1924*

Class of consumer owner	Number of mines	Loaded at mines for shipment (net tons)	Per cent	Made into coke at mines (net tons)	Per cent	Sold to local trade and used by employees (net tons)	Per cent	Used at mines for steam and heat (net tons)	Per cent	Total quantity (net tons)
Railroads	135	25,821,612	95.8	268,808	1.0	309,905	1.1	565,818	2.1	26,966,143
Public utilities	53	7,385,439	81.7	55,926	.6	1,547,892	17.2	50,137	.5	9,039,394
By-product coke plants	38	7,302,334	92.4	469,310	5.9	53,775	.7	76,115	1.0	7,901,534
Steel plants [1]	232	47,128,451	81.8	6,742,442	11.7	2,666,775	4.6	1,055,768	1.9	57,593,436
Industries other than steel	191	7,823,611	77.1	298,944	2.9	1,865,844	18.4	165,677	1.6	10,154,076
	649	95,461,447	85.5	7,835,430	7.0	6,444,191	5.8	1,913,515	1.7	111,654,583

[1] Most of the 232 mines controlled by steel plants were producing coking coal, part of which was charged into by-product coke ovens.

TABLE 23.—*Production of captive bituminous coal mines, grouped by business of consumer owner, by States, in 1924, in net tons*

State	Railroads	Public utilities	By-product coke plants	Steel plants [1]	Industries other than steel	Total
Alabama	591,268	180,095	447,994	7,847,335	77,978	9,144,670
Arkansas	133,689					133,689
Colorado	186,930			2,940,408	506,826	3,634,164
Georgia				72,947		72,947
Illinois	7,097,833	5,358,098	84,534	2,599,386	1,135,047	16,274,898
Indiana		178,363	508,559	223,068	29,087	939,077
Iowa	872,635	1,219				873,854
Kansas	940,520				3,173	943,693
Kentucky	463,295	817,836	2,377,423	3,284,853	1,561,298	8,504,705
Maryland		808			17,390	18,198
Missouri	215,337					215,337
Montana	1,830,882				245,026	2,075,908
New Mexico					1,380,283	1,380,283
North Dakota		60,480			11,945	72,425
Ohio	3,621,561	1,665		682,439	1,087,577	5,393,242
Oklahoma	249,751				11,949	261,700
Pennsylvania	4,283,618	1,011,647	2,461,458	31,563,772	2,298,227	41,618,722
Tennessee		127,948		688,878	73,392	890,218
Texas	38,542					38,542
Utah	1,012,701			213,097	730,460	1,956,258
Virginia				540,386	14,433	554,819
Washington	1,075,942	24,218			19,821	1,119,981
West Virginia	1,529,959	1,277,017	2,021,566	6,936,867	477,715	12,243,124
Wyoming	2,821,680				472,449	3,294,129
	26,966,143	9,039,394	7,901,534	57,593,436	10,154,076	111,654,583

[1] Most of the coal controlled by steel plants was used for coking.

AVERAGE WORKING TIME

The common opinion that the average working time in consumer-owned mines is higher than in commercial operations is confirmed by the figures in Table 24. It will be seen that with the exception of Virginia and the less important States, Arkansas, Maryland, Oklahoma, Texas, Utah, and Washington, the working time of the captive mines was substantially higher. In the important producing States, such as Pennsylvania, Illinois, West Virginia, Alabama, and Kentucky, the captive group showed steadier working time.

In 1924 the average time worked by all bituminous coal mines was 171 days, while the average time worked by captive mines was 194 days as compared with 165 days for commercial mines alone. The captive mines in Alabama and Georgia averaged 250 working days, while those in Colorado, Iowa, Kansas, New Mexico, Pennsylvania, and Virginia reached or bettered the 200-day mark.

COMPARATIVE VALUE OF OUTPUT

As might be expected, the average value per ton reported by the consumer-owned mines was generally higher than that of the commercial mines. In 1924 the value per ton placed on the captive tonnage was 30 cents more than on the commercial, the former averaging $2.43 as against $2.13 per ton for the latter. (Table 25.) Alabama, Arkansas, Iowa, Montana, Oklahoma, Virginia, and Washington were the only States where the commercial coal commanded higher prices than the captive in 1924. In States like Pennsylvania, West Virginia, and Kentucky, where the captive mines produce largely high-grade coking coals, the differential ranged from 22 to 35 cents a ton in favor of the consumer-owned tonnage.

TABLE 24.—*Comparative working time in commercial and captive bituminous coal mines in 1924*

State	Average number of days worked			State	Average number of days worked		
	Captive mines	Commercial mines	All mines		Captive mines	Commercial mines	All mines
Alabama	250	200	220	North Dakota	190	164	165
Arkansas	99	138	134	Ohio	189	136	143
Colorado	200	168	178	Oklahoma	98	129	124
Georgia	250	137	248	Pennsylvania	205	171	180
Illinois	163	144	148	Tennessee	170	155	159
Indiana	144	136	136	Texas	82	177	166
Iowa	235	153	161	Utah	170	194	182
Kansas	201	141	151	Virginia	209	227	226
Kentucky	181	172	174	Washington	165	230	202
Maryland	66	175	173	West Virginia	188	181	182
Missouri	136	135	135	Wyoming	186	167	176
Montana	191	147	173				
New Mexico	232	179	204		194	165	171

TABLE 25.—*Average value per net ton of bituminous coal produced at commercial and captive mines in 1924*

State	Average value of coal produced—		State	Average value of coal produced—	
	At captive mines	At commercial mines		At captive mines	At commercial mines
Alabama	$2.30	$2.38	North Dakota	$2.25	$2.05
Arkansas	3.20	4.15	Ohio	2.23	1.99
Colorado	3.32	2.91	Oklahoma	3.65	3.69
Georgia	3.66	1.97	Pennsylvania	2.41	2.19
Illinois	2.30	2.26	Tennessee	2.21	2.11
Indiana	2.30	2.16	Texas	3.49	1.43
Iowa	3.26	3.32	Utah	2.88	2.54
Kansas	3.09	3.01	Virginia	1.98	2.04
Kentucky	2.15	1.81	Washington	3.58	3.70
Maryland	3.19	2.16	West Virginia	2.13	1.78
Missouri	3.69	3.25	Wyoming	2.81	2.62
Montana	2.86	3.21			
New Mexico	3.52	3.49		2.43	2.13

INCREASE IN CONSUMER-OWNED OUTPUT SINCE 1913

With the complete census of consumer-owned operations in 1924 as a starting point, a study was made of the number and production of the captive mines in operation in each year from 1913 to 1926, the results of which are given in Tables 26 and 27. All captive mines reporting in 1924 were asked to supply information for the years 1913 to 1926, inclusive; the secretaries of local operators' associations were asked to furnish the names of any mines which had passed from the captive to the commercial class between 1913 and 1924 and the names of any captive operations developed since 1924. The bureau's own records of abandoned mines were searched for the names of any former captive mines which had been closed down before 1924. The resulting tabulation was carefully checked against a study previously made by the United States Geological Survey covering 1920 and 1921,[31] against complete records kept by certain

[31] Duncan, C. S., Report on Coal Marketing, mimeographed pp. 83–94. See reprint in the Black Diamond, Aug. 25, 1923, p. 229, and Sept. 1, 1923, pp. 256–257.

operators' associations in Illinois and Pennsylvania, and against current information in the trade journals. These methods are believed to have built up a record which may omit a few small operations formerly controlled by local industries, such as brick and tile works that have since gone out of business, but which includes all important cases of consumer ownership back to 1913. Table 26 is believed to give a faithful picture of the growth of captive tonnage in recent years.

The table shows that the number of consumer-owned mines increased from 417 in 1913 to 555 in 1926, and that during the same period their production increased from 88,292,077 to 130,098,658 tons. Expansion in consumer ownership began during the war and was accelerated in the trying years immediately following, when acute shortages and high prices induced numerous large companies to acquire mines in order to provide for their own requirements. This stage of expansion culminated in 1923, the year following the great strike, with 671 captive mines in operation. (Table 26.) The depression which began in 1924 has resulted in the closing of many consumer-owned mines, so that the number now in operation is less than during 1923. The proportion of the total output, however, was practically the same in 1926 as in 1923. A better picture of the growth of captive mines is shown by the columns of index numbers in Table 27, which indicate the relative importance of consumer-owned tonnage as compared with the commercial output.

TABLE 26.—*Production of consumer-owned bituminous coal mines, by States, 1913–1926* [1]

[Note that figures include surplus tonnage sold on commercial market, which in some States is a large proportion of the production. See Table 21]

State	1913		1914		1915		1916		1917		1918		1919	
	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)
Alabama	32	8,261,947	28	7,139,484	26	6,994,810	29	8,965,815	32	8,771,013	34	7,249,012	35	5,948,861
Arkansas	5	477,551	3	331,408	3	251,256	7	217,436	10	131,942	7	174,825	6	93,683
Colorado	26	3,133,819	22	2,395,867	24	2,717,024	24	3,605,209	25	4,254,218	29	4,324,981	31	3,904,701
Georgia	1	235,892	1	165,098	1	128,841	1	167,554	1	117,403	1	64,996	1	53,337
Illinois	19	6,760,287	23	6,768,172	21	7,236,249	24	9,838,628	33	12,318,796	41	13,946,283	39	11,482,558
Indiana	3	162,237	4	194,272	4	302,862	6	853,849	9	1,468,941	11	1,349,837	11	918,647
Iowa	1	408,738	2	688,406	2	711,268	3	676,791	3	872,718	4	895,497	4	689,977
Kansas	13	1,445,428	12	949,341	11	764,702	7	778,003	7	906,285	7	1,056,288	9	768,710
Kentucky	6	293,264	6	375,489	8	507,014	12	989,208	20	1,783,430	24	3,079,051	28	4,540,060
Maryland							1	64,454	1	149,256	1	143,974	1	78,639
Missouri	7	557,992	8	485,828	8	527,976	7	477,399	6	490,358	7	469,273	7	320,359
Montana	6	2,139,993	8	1,981,541	8	1,974,975	8	2,763,789	10	2,768,702	11	2,957,861	12	2,231,220
New Mexico	1	1,322,281	1	1,335,551	1	1,272,808	1	1,317,988	4	1,494,185	5	1,749,194	6	1,258,846
North Dakota	2	18,576	2	21,073	2	28,918	2	26,151	2	28,478	2	28,910	3	34,983
Ohio	72	6,030,408	76	3,542,581	78	4,359,458	76	6,659,393	81	6,411,690	89	6,955,944	87	5,529,177
Oklahoma	9	1,058,725	6	646,014	6	580,939	5	588,183	9	743,201	9	625,612	7	578,498
Pennsylvania	136	37,135,006	138	28,949,011	143	36,646,371	145	25,800,808	173	39,569,418	191	36,856,638	183	36,211,517
Tennessee	16	1,819,435	16	1,518,479	11	1,531,412	11	1,372,259	15	1,704,351	15	1,739,377	11	1,369,673
Texas	2	757,814	2	703,393	2	745,534	7	687,815	7	724,986	5	603,315	4	401,677
Utah	9	2,531,871	9	2,270,367	9	2,235,943	9	2,512,049	9	2,742,485	9	3,307,373	9	2,644,383
Virginia	1	1,184,706	1	1,171,219	1	1,103,917	1	1,098,542	3	999,987	3	801,161	3	802,370
Washington	10	1,402,277	11	1,333,049	12	1,012,636	10	1,311,447	9	1,577,620	9	1,668,169	9	1,309,995
West Virginia	33	8,381,101	32	7,744,644	31	8,799,672	40	10,603,070	50	6,278,263	59	11,834,609	55	11,156,117
Wyoming	7	2,772,729	15	2,271,685	14	2,722,926	8	4,130,054	18	3,765,704	19	3,952,931	8	2,729,908
	417	88,292,077	426	72,981,972	426	83,157,511	444	85,505,894	537	100,073,430	592	105,835,111	569	95,057,896

[1] Figures subject to revision.

TABLE 26.—*Production of consumer-owned bituminous coal mines, by States, 1913–1926*—Continued

[Note that figures include surplus tonnage sold on commercial market, which in some States is a large proportion of the production. See Table 21]

State	1920		1921		1922		1923		1924		1925		1926	
	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)	Number of mines	Production (net tons)
Alabama	35	7,093,496	37	5,510,953	35	7,831,008	36	8,959,910	37	9,144,670	34	8,951,361	35	9,255,737
Arkansas	5	124,061	6	202,063	5	175,419	4	163,087	4	133,689	5	46,948	3	136,324
Colorado	31	4,880,512	30	3,198,257	30	3,825,667	30	3,785,757	28	3,634,164	27	3,616,723	25	3,914,188
Georgia	1	50,156	1	33,815	1	60,636	1	72,270	1	72,947	1	66,174	1	59,869
Illinois	44	17,201,630	45	15,118,210	41	12,939,270	41	20,333,531	40	16,274,898	32	18,155,263	32	19,106,779
Indiana	11	1,468,295	9	1,267,170	9	1,126,160	10	1,841,254	9	939,077	7	838,111	5	366,203
Iowa	5	918,997	5	796,091	4	491,934	4	710,498	5	873,854	4	937,995	4	989,795
Kansas	11	870,972	11	634,583	10	540,363	10	1,072,760	10	943,693	8	832,448	6	601,938
Kentucky	33	5,458,415	33	6,044,399	40	7,085,914	41	9,051,951	40	8,504,705	32	10,535,750	32	11,210,631
Maryland	1	98,279	1	84,348	1	70,738	2	64,631	2	18,198				
Missouri	8	458,282	7	388,991	6	277,332	4	394,909	4	215,337	5	283,027	5	426,160
Montana	13	3,096,021	12	1,922,646	10	1,620,152	11	2,196,238	11	2,075,908	8	2,228,589	8	2,031,158
New Mexico	6	1,506,062	6	1,003,054	7	1,382,411	6	1,413,003	5	1,380,283	3	1,266,072	3	1,479,246
North Dakota	4	41,625	4	62,549	5	75,567	5	73,278	5	72,425	4	71,878	3	67,453
Ohio	92	5,630,754	90	5,554,432	96	3,644,871	101	5,848,712	95	5,393,242	87	3,158,256	85	3,204,476
Oklahoma	7	626,450	7	672,880	6	354,712	5	645,421	5	261,700	3	357,368	5	505,926
Pennsylvania	205	40,099,548	214	29,777,977	216	29,353,732	224	52,936,038	215	41,618,722	196	45,483,999	188	50,515,809
Tennessee	17	1,647,470	17	913,596	17	1,344,029	16	1,472,571	13	890,218	15	1,215,881	11	1,113,606
Texas	2	230,926	2	48,239	2	69,411	2	38,554	2	38,542	2	50,534	1	32,600
Utah	9	3,187,191	9	1,996,018	9	2,495,702	10	2,079,389	10	1,956,258	10	2,154,414	9	1,989,207
Virginia	3	862,663	3	435,861	3	685,561	4	775,278	4	554,819	3	851,616	3	922,865
Washington	10	1,772,056	7	1,512,423	8	1,084,716	9	1,467,505	9	1,119,981	5	938,677	5	1,165,404
West Virginia	71	12,024,933	69	9,217,310	73	10,149,400	73	10,100,797	75	12,243,124	70	15,880,889	66	17,807,392
Wyoming	19	3,499,302	23	3,339,421	23	2,568,102	22	3,715,197	20	3,294,129	20	3,234,709	20	3,195,892
	643	112,839,096	648	89,735,286	657	89,252,807	671	129,212,539	649	111,654,583	581	121,156,682	555	130,098,658

TABLE 27.—*Number and production of consumer-owned bituminous coal mines, 1913–1926*

Year	Consumer-owned mines			Commercial mines		Total, all mines		Per cent of total production	
	Number	Production (net tons)	Index numbers	Production (net tons)	Index numbers	Production (net tons)	Index numbers	Consumer-owned	Commercial
1913	417	88,292,077	100	390,143,220	100	478,435,297	100	18.5	81.5
1914	426	72,981,972	83	349,721,998	90	422,703,970	88	17.3	82.7
1915	426	83,157,511	94	359,466,915	92	442,624,426	93	18.8	81.2
1916	444	85,505,894	97	417,013,788	107	502,519,682	105	17.0	83.0
1917	537	100,073,430	113	451,717,133	116	551,790,563	115	18.1	81.9
1918	592	105,835,111	120	473,550,709	121	579,385,820	121	18.3	81.7
1919	569	95,057,896	108	370,802,162	95	465,860,058	97	20.4	79.6
1920	643	112,839,096	128	455,827,587	117	568,666,683	119	19.8	80.2
1921	648	89,735,286	102	326,186,664	84	415,921,950	87	21.6	78.4
1922	657	89,252,807	101	333,015,292	85	422,268,099	88	21.1	78.9
1923	671	129,212,539	146	435,352,123	112	564,564,662	118	22.9	77.1
1924	649	111,654,583	126	372,031,955	95	483,686,538	101	23.1	76.9
1925	581	121,156,682	137	398,896,059	102	520,052,741	109	23.3	76.7
1926	555	130,098,658	147	443,268,327	114	573,366,985	120	22.7	77.3

MEN EMPLOYED

METHOD OF COLLECTING EMPLOYMENT STATISTICS

The method of collecting employment statistics is explained in detail in Coal in 1925, pages 428 to 431. It is believed these statistics represent the most accurate returns obtainable under present conditions, both as to the records generally available in mine offices and as to the funds allotted to the Bureau of Mines for collecting data.

The number of men employed at bituminous coal mines reached a maximum in 1923, when 704,793 men were reported. By the end of 1925 there was a reduction of 116,300 men, the total number reported for 1925 being 588,493. Larger output and better business in 1926 brought a slight increase in the working force, and a total of 593,647 men was reported.

TABLE 28.—*Comparative number of employees in coal mines, by States, 1923–1926. (See also fig. 12)*

State	Average number employed				Per cent of increase or decrease		
	1923	1924	1925	1926	1923–1926	1924–1926	1925–26
Alabama	30,035	27,956	27,097	27,345	−9.0	−2.2	+0.9
Arkansas	3,754	3,350	3,638	3,589	−4.4	+7.1	−1.3
Colorado	13,340	12,954	13,203	12,815	−3.9	−1.1	−2.9
Illinois	99,714	89,363	77,823	75,870	−23.9	−15.1	−2.5
Indiana	35,408	27,558	22,732	23,404	−33.9	−15.1	+3.0
Iowa	11,448	12,101	10,167	8,869	−22.5	−26.7	−12.8
Kansas	9,761	8,561	7,800	8,172	−16.3	−4.5	+4.8
Kentucky	60,811	55,766	57,024	60,578	−.4	+8.6	+6.3
Maryland	3,725	3,776	3,580	3,681	−1.2	−2.5	+2.8
Michigan	1,977	1,551	1,579	1,573	−20.4	+1.4	−.4
Missouri	6,952	5,977	5,114	5,270	−24.2	−11.8	+3.1
Montana	3,511	3,196	2,680	2,419	−31.1	−24.3	−9.7
New Mexico	4,095	4,206	3,444	3,167	−22.7	−24.7	−8.0
North Dakota	1,621	1,298	1,307	1,288	−20.5	−.8	−1.5
Ohio	54,555	44,229	39,658	38,547	−29.3	−12.8	−2.8
Oklahoma	7,130	6,144	5,631	5,400	−24.3	−12.1	−4.1
Pennsylvania, bituminous	194,981	169,322	156,798	155,999	−20.0	−7.9	−.5
Tennessee	11,244	9,365	8,314	7,948	−29.3	−15.1	−4.4
Texas	2,452	2,195	2,108	1,650	−32.7	−24.8	−21.7
Utah	4,381	4,330	4,441	3,545	−19.1	−18.1	−20.2
Virginia	14,120	12,679	13,677	13,764	−2.5	+8.6	+.6
Washington	4,306	3,858	3,726	3,609	−16.2	−6.5	−3.1
West Virginia	117,300	102,203	110,189	118,726	+1.2	+16.2	+7.7
Wyoming	7,529	7,113	6,238	5,862	−22.2	−17.6	−6.0
Other States [1]	643	553	525	557	−13.4	+.7	+6.1
Total bituminous	704,793	619,604	588,493	593,647	−15.8	−4.2	+.9
Pennsylvania anthracite	157,743	160,009	160,312	165,386	+4.6	+3.4	+3.2
Grand total	862,536	779,613	748,805	759,033	−12.0	−2.6	+1.4

[1] Includes Alaska, Arizona (1926), California, Georgia, Idaho, Nebraska (1924), North Carolina, Oregon, and South Dakota.

TABLE 29.—*Men employed underground and on the surface in coal mines, 1917–1926*

[Corresponding data for the years 1911 to 1916 will be found in Coal in 1924, p. 481]

Year	Underground						Surface		Total number
	Miners, loaders, and shot firers		All others [1]		Total underground		Number	Per cent	
	Number	Per cent	Number	Per cent	Number	Per cent			
Anthracite:									
1917	(2)	(2)	(2)	(2)	109,989	71.3	44,185	28.7	154,174
1918	(2)	(2)	(2)	(2)	101,671	69.1	45,450	30.9	147,121
1919	(2)	(2)	(2)	(2)	107,829	69.8	46,742	30.2	154,571
1920	63,339	43.6	37,684	26.1	101,023	69.7	44,051	30.3	145,074
1921	73,977	46.4	42,840	26.8	116,817	73.2	42,682	26.8	159,499
1922	72,527	46.2	41,752	26.6	114,279	72.8	42,570	27.2	156,849
1923	72,362	45.9	42,359	26.8	114,721	72.7	43,022	27.3	157,743
1924	76,035	47.5	43,328	27.1	119,363	74.6	40,646	25.4	160,009
1925	78,773	49.1	41,795	26.1	120,568	75.2	39,744	24.8	160,312
1926	81,963	49.5	44,268	26.8	126,231	76.3	39,155	23.7	165,386
Bituminous:									
1917	(2)	(2)	(2)	(2)	498,185	82.6	104,958	17.4	603,143
1918	(2)	(2)	(2)	(2)	496,252	80.7	119,053	19.3	615,305
1919	(2)	(2)	(2)	(2)	508,801	81.8	113,197	18.2	621,998
1920	355,660	55.5	174,152	27.3	529,812	82.8	109,735	17.2	639,547
1921	399,270	60.1	168,019	25.4	567,289	85.5	96,465	14.5	663,754
1922	407,772	59.3	174,637	25.3	582,409	84.6	105,549	15.4	687,958
1923	422,040	59.9	178,265	25.3	600,305	85.2	104,488	14.8	704,793
1924	380,324	61.4	151,580	24.4	531,904	85.8	87,700	14.2	619,604
1925	367,456	62.5	139,085	23.6	506,541	86.1	81,952	13.9	588,493
1926	370,292	62.3	140,532	23.7	510,824	86.0	82,823	14.0	593,647

[1] Includes haulage and trackmen. [2] No data.

TABLE 30.—*Men employed in coal mines, by States, in 1926*

State	Underground						Surface		Total number
	Miners, loaders, and shot firers		Haulage and track		All others		Number	Per cent	
	Number	Per cent	Number	Per cent	Number	Per cent			
Alabama	16,140	59.0	3,378	12.4	3,506	12.8	4,321	15.8	27,345
Alaska	47	35.9	8	6.1	24	18.3	52	39.7	131
Arizona	1	100.0							1
Arkansas	2,213	61.7	251	7.0	392	10.9	733	20.4	3,589
California, Idaho, and Oregon	51	56.0	4	4.4	16	17.6	20	22.0	91
Colorado	8,160	63.7	1,456	11.4	1,238	9.6	1,961	15.3	12,815
Georgia							127	100.0	127
Illinois	51,993	68.5	8,191	10.8	8,104	10.7	7,582	10.0	75,870
Indiana	14,664	62.7	2,623	11.2	2,754	11.8	3,363	14.3	23,404
Iowa	6,438	72.6	748	8.4	1,006	11.4	677	7.6	8,869
Kansas	5,700	69.8	590	7.2	541	6.6	1,341	16.4	8,172
Kentucky	35,964	59.4	7,443	12.3	8,257	13.6	8,914	14.7	60,578
Maryland	2,449	66.5	390	10.6	368	10.0	474	12.9	3,681
Michigan	1,111	70.6	182	11.6	151	9.6	129	8.2	1,573
Missouri	3,363	63.8	322	6.1	417	7.9	1,168	22.2	5,270
Montana	1,445	59.8	296	12.2	261	10.8	417	17.2	2,419
New Mexico	1,930	60.9	373	11.8	357	11.3	507	16.0	3,167
North Carolina	65	41.9	43	27.8	22	14.2	25	16.1	155
North Dakota	712	55.3	70	5.4	76	5.9	430	33.4	1,288
Ohio	26,895	69.8	3,495	9.0	3,462	9.0	4,695	12.2	38,547
Oklahoma	2,898	53.7	688	12.7	682	12.6	1,132	21.0	5,400
Pennsylvania, bituminous	102,717	65.8	16,254	10.4	16,988	10.9	20,040	12.9	155,999
South Dakota	52	100.0							52
Tennessee	4,912	61.8	1,014	12.8	824	10.3	1,198	15.1	7,948
Texas	1,107	67.1	202	12.2	105	6.4	236	14.3	1,650
Utah	2,174	61.3	425	12.0	344	9.7	602	17.0	3,545
Virginia	7,008	50.9	1,967	14.3	2,592	18.8	2,197	16.0	13,764
Washington	1,988	55.1	370	10.3	502	13.9	749	20.7	3,609
West Virginia	64,389	54.3	18,068	15.2	17,495	14.7	18,774	15.8	118,726
Wyoming	3,706	63.2	693	11.8	504	8.6	959	16.4	5,862
Total bituminous	370,292	62.4	69,544	11.7	70,988	12.0	82,823	13.9	593,647
Pennsylvania anthracite	81,963	49.5	20,000	12.1	24,268	14.7	39,155	23.7	165,386
Grand total	452,255	59.6	89,544	11.8	95,256	12.5	121,978	16.1	759,033

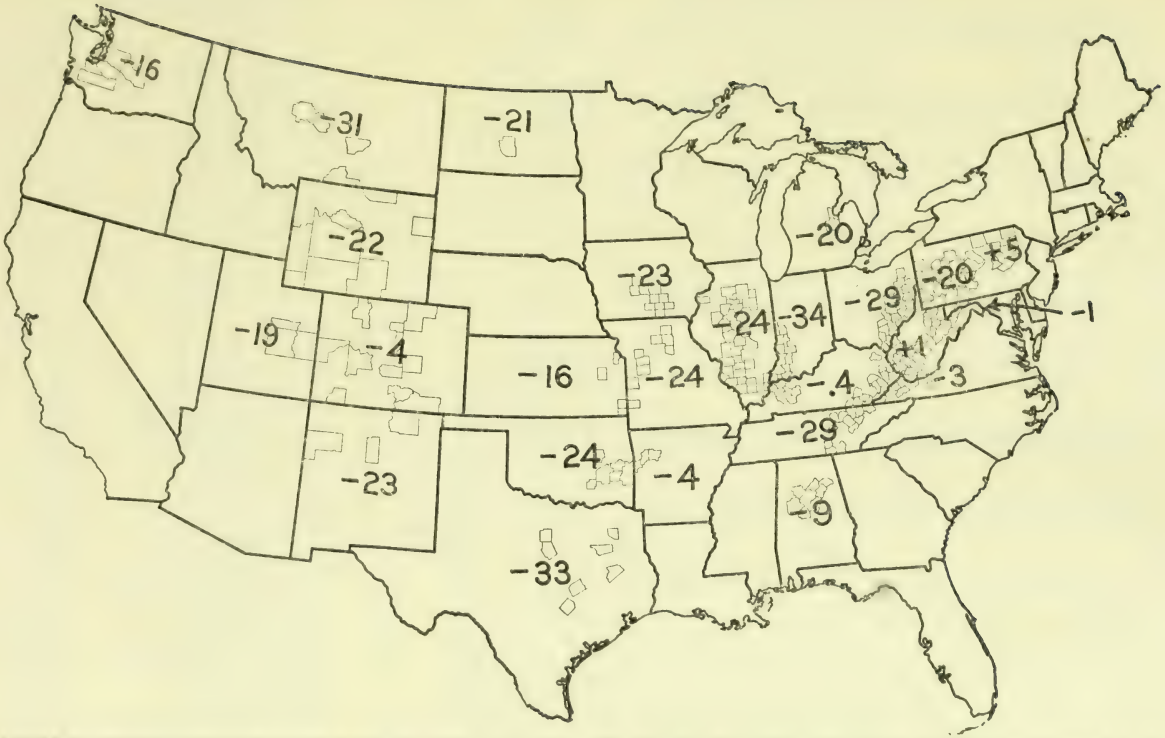

FIGURE 12.—Per cent of change in number of men employed in coal mines, 1923–1926. For Pennsylvania two figures are shown, an increase of 5 per cent for anthracite and a decrease of 20 per cent for bituminous

DAYS WORKED BY MINES

TABLE 31.—*Average number of days worked by coal mines, by States, 1917–1926*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Alabama	273	278	239	247	166	215	232	220	246	266
Alaska	(1)	254	280	240	244	147	220	287	243	221
Arizona										90
Arkansas	187	204	136	176	112	81	97	134	112	135
California[1]	173	240	59	181	149	250	206	156	174	103
Colorado	263	255	225	255	164	191	174	178	192	202
Georgia	269	258	284	294	183	242	231	248	220	253
Illinois	243	238	160	213	152	120	158	148	161	172
Indiana	221	227	148	192	128	110	136	136	159	173
Iowa	251	245	176	250	148	131	181	161	153	183
Kansas	216	234	182	204	137	125	139	151	169	158
Kentucky	214	230	189	182	152	140	152	174	206	220
Maryland	254	261	179	207	120	101	178	173	209	235
Michigan	254	237	179	261	196	162	222	178	186	171
Missouri	240	235	175	233	166	113	155	135	166	174
Montana	268	264	194	250	143	140	179	173	171	162
New Mexico	321	301	273	302	150	216	216	204	202	251
North Carolina		40	100	288	300	167	275	287	272	292
North Dakota	255	229	216	218	194	175	182	165	153	162
Ohio	210	223	164	188	134	100	150	143	151	159
Oklahoma	211	228	184	217	141	114	133	124	153	183
Oregon	251	292	259	307	(1)	(1)	(1)	(1)	(1)	(1)
Pennsylvania, bituminous	261	269	218	244	151	154	213	180	200	224
South Dakota	154	145	164	133	129	138	122	138	143	127
Tennessee	241	265	201	234	154	163	183	159	211	234
Texas	263	262	227	242	139	185	178	166	150	195
Utah	219	258	239	252	151	204	160	182	179	186
Virginia	273	277	247	262	166	198	212	226	254	263
Washington	271	275	217	260	159	194	213	202	193	198
West Virginia	225	238	200	198	149	143	169	182	225	247
Wyoming	246	268	221	264	167	128	192	176	178	181
Total bituminous	243	249	195	220	149	142	179	171	195	215
Pennsylvania anthracite	285	293	266	271	271	151	268	274	182	244
Grand total	251	258	209	230	173	144	195	192	192	221

[1] California includes Idaho, 1917–1920; Idaho and Oregon, 1921–1926, and also Nebraska in 1924. The number of days was not reported for Alaska in 1917.

LENGTH OF WORKING DAY

ESTABLISHED WORKING DAY

The established working day in the coal mines of the United States is now generally 8 hours. When market and other conditions permit, the mines work 6 days a week and the established working week is 48 hours. Beginning with 1918, more than 90 per cent of the men have been employed in 8-hour mines, but there has been a slight increase in the proportion of 9 and 10 hour mines since 1922.

TABLE 32.—*Number of bituminous coal mines having established working day of certain length and number of men employed in 1926*

State	8 hours [1]		9 hours		10 hours		All others [2]		Total	
	Mines	Men	Mines	Men	Mines	Men	Mines	Men	Mines	Men
Alabama	94	7,756	84	16,143	23	2,435	26	1,011	227	27,345
Alaska	4	123					2	8	6	131
Arkansas	97	3,504			2	85			99	3,589
California, Arizona, Idaho, and Oregon	3	60					3	32	6	92
Colorado	148	12,548					73	267	221	12,815
Georgia	1	127							1	127
Illinois	339	75,057	1	5			175	808	515	75,870
Indiana	179	23,253	2	30			24	121	205	23,404
Iowa	123	8,422					70	447	193	8,869
Kansas	157	7,132	3	30			92	1,010	252	8,172
Kentucky	554	54,803	43	5,041	10	488	28	246	635	60,578
Maryland	66	3,348	1	36			30	297	97	3,681
Michigan	9	1,573							9	1,573
Missouri	115	4,764	7	191			45	315	167	5,270
Montana	31	2,300			1	71	13	48	45	2,419
New Mexico	29	3,150					6	17	35	3,167
North Carolina	2	155							2	155
North Dakota	53	851	1	9	7	160	89	268	150	1,288
Ohio	466	37,261	7	136	9	547	143	603	625	38,547
Oklahoma	107	4,907	5	367	2	123	1	3	115	5,400
Pennsylvania, bituminous	1,746	151,421	62	3,393	3	125	152	1,060	1,963	155,999
South Dakota							24	52	24	52
Tennessee	82	7,365	4	523			7	60	93	7,948
Texas	18	878	10	486	1	206	3	80	32	1,650
Utah	34	3,508					4	37	38	3,545
Virginia	106	13,495	1	72			2	197	109	13,764
Washington	51	3,609							51	3,609
West Virginia	1,127	112,073	31	5,595	9	588	34	470	1,201	118,726
Wyoming	57	5,847					4	15	61	5,862
	5,798	549,290	262	32,057	67	4,828	1,050	7,472	7,177	593,647

[1] Includes outside employees working 9 or 10 hours a day at many mines where the established time for underground workers is 8 hours.

[2] Includes employees in mines where the established working day was changed during year, or where the working day was irregular, or which failed to answer the inquiry.

TABLE 33.—*Per cent of men employed in bituminous coal mines that had established working days of 8, 9, and 10 hours, 1905–1926* [1]

Year	Per cent of total employees in—			Weighted average working day (hours)	Year	Per cent of total employees in—			Weighted average working day (hours)
	8-hour mines	9-hour mines	10-hour mines			8-hour mines	9-hour mines	10-hour mines	
1905	61.1	13.6	25.3	8.6	1917	79.0	12.6	8.4	8.3
1906	63.0	13.5	23.5	8.6	1918	90.6	6.7	2.7	8.12
1907	64.0	11.6	24.4	8.6	1919	95.5	3.5	1.0	8.06
1908	63.5	11.1	25.4	8.6	1920	97.1	2.0	.9	8.04
1910	62.1	11.3	26.6	8.6	1921	96.6	2.9	.5	8.04
1911	62.9	10.9	26.2	8.6	1922	95.1	4.0	.9	8.06
1912	61.6	11.5	26.9	8.6	1923	94.7	4.2	1.1	8.06
1913	61.9	15.2	22.9	8.6	1924	93.7	5.1	1.2	8.08
1914	60.7	15.4	23.9	8.6	1925	93.5	5.4	1.1	8.08
1915	59.6	17.0	23.4	8.6	1926	93.7	5.5	.8	8.07
1916	58.6	17.4	24.0	8.6					

[1] Calculated on base of total number of men in mines definitely reported as having 8, 9, or 10 hour day. A small number of mines that work more than 10 hours or less than 8 hours have been excluded, as have also all mines for which the reports were defective or which changed their working day during the year.

AVERAGE TIME SPENT UNDERGROUND

In discussing the length of the working day in the coal mines it is necessary to distinguish between the established working day and the time actually spent at work. The established working day does not of itself measure the length of time the men actually work, because the mine may shut down before the full day is out, because the miner may go home before the mine stops, and because he spends a certain amount of time going to and from his place of work underground. Allowing for these other factors, how much time does the man actually spend at work and how long is he underground?

As interpreted in the union wage agreements, the 8-hour day means 8 hours of labor at the usual working place, exclusive of time for lunch and exclusive of time spent in going from the entrance of the mine to the working place and back again. In general, this provision applies both to piece workers and day-wage workers underground, though certain classes of daymen have duties to be performed outside the 8 hours. Motormen and drivers are ordinarily required to take motors and mules on their own time to and from the stables and the parting or station where they begin hauling, and this time is not counted as part of the day's labor.

Although the wage agreements specify 8 hours of labor, it does not follow that men are always at work 8 hours in the day. Shortage of railroad cars at the tipple, lack of orders, a petty strike, or a breakdown within the mine may cause it to stop work before the 8 hours are over. Time-workers may lose fractional days through sickness or accident. In particular, the tonnage men, who constitute 40 to 70 per cent of the working force, may leave early before the mine as a whole stops work, because the custom of the industry allows them that freedom. Only in the rarest instances is a record kept of the time these men are in the mine. Sometimes they leave because they have finished their allotted work for the day, sometimes because they feel sick or have other interests to attend to, or sometimes simply because they have earned enough for one day. The amount and the causes of this early quitting have been a subject of discussion and even of controversy between operators and employees.

The nominal working day, therefore, measures neither the length of time spent by the men at work nor the length of time they are underground, and it was not until recently that any figures on these points were available. In connection with its periodic surveys of miners' earnings, the Bureau of Labor Statistics arranged to have a special record kept of the time actually spent in the mine by many thousands of tonnage men during typical biweekly pay periods. The results, which show the time spent at the working place and also the total time in the mine, will be found in publications of the Bureau of Labor Statistics, United States Department of Labor, as follows: Monthly Labor Review for July, 1925, pages 68 to 87, and for February, 1926, pages 77 to 87, Bulletins 316, 416, and 454.

OUTPUT PER MAN

TABLE 34.—*Coal produced per man per day and per year, by States, 1917–1926, in net tons*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Per man per day:										
Alabama	2.59	2.63	2.42	2.56	2.93	3.01	2.93	3.11	3.00	2.89
Arkansas	2.87	2.75	2.76	2.94	3.03	3.32	3.39	3.24	2.99	3.00
Colorado	3.33	3.36	3.88	3.51	3.83	3.87	[1] 4.45	[1] 4.52	[1] 4.07	[1] 4.11
Illinois	4.22	4.37	4.48	4.78	4.80	5.05	5.02	5.16	5.33	5.31
Indiana	4.52	4.45	4.72	4.86	4.86	5.19	5.43	5.75	5.89	5.72
Iowa	2.50	2.51	2.59	2.61	2.69	2.55	2.75	2.80	3.02	2.85
Kansas	3.12	3.03	2.89	3.19	3.08	3.02	3.19	3.29	3.44	3.43
Kentucky	3.72	3.50	3.49	3.95	4.11	4.89	4.83	4.67	4.68	4.52
Maryland	3.16	3.10	3.13	3.50	3.27	3.15	3.42	3.27	3.61	3.56
Michigan	2.25	2.42	2.65	2.65	2.63	2.65	2.67	3.00	2.75	2.55
Missouri	2.44	2.51	2.44	2.56	2.50	2.88	3.07	3.08	3.18	3.27
Montana	3.80	3.77	4.05	4.19	4.57	5.03	5.00	5.26	6.64	7.14
New Mexico	3.02	3.26	3.07	3.26	3.58	3.61	3.28	3.25	3.68	3.54
North Dakota	3.78	3.79	3.63	3.75	4.19	4.39	4.60	5.62	6.61	6.56
Ohio	4.26	4.24	4.41	4.73	4.60	4.92	4.95	4.82	4.67	4.56
Oklahoma	2.45	2.50	2.45	2.70	2.70	3.12	2.99	3.05	2.70	2.88
Pennsylvania, bituminous	3.80	3.81	3.96	3.96	4.03	3.84	4.15	4.27	4.36	4.37
Tennessee	2.46	2.41	2.25	2.48	2.80	2.59	2.93	3.05	3.11	3.11
Texas	2.05	2.19	2.03	2.26	2.42	2.10	2.72	3.16	3.19	3.39
Utah [1]	5.40	4.79	5.03	5.29	6.10	5.18	6.73	5.70	5.90	6.65
Virginia	3.31	3.38	3.26	3.06	3.78	3.93	3.92	3.73	3.69	3.91
Washington	2.79	2.91	2.74	2.89	3.52	2.96	3.19	3.41	3.52	3.62
West Virginia	4.35	4.22	4.18	4.39	4.79	5.10	5.44	5.48	4.94	4.90
Wyoming	4.74	4.66	4.48	4.69	5.08	5.15	5.23	5.41	5.90	6.15
Total bituminous	3.77	3.78	3.84	4.00	4.20	4.28	4.47	4.56	4.52	4.50
Pennsylvania anthracite	[2] 2.27	[2] 2.29	2.14	[2] 2.28	2.09	[2] 2.31	2.21	2.00	2.12	2.09
Grand total	3.43	3.45	3.41	3.65	3.55	3.89	3.91	3.81	4.04	3.92
Per man per year:										
Alabama	707	732	578	632	487	647	680	684	738	768
Arkansas	536	560	375	517	340	269	329	433	335	407
Colorado	877	857	873	895	628	740	774	806	781	830
Illinois	1,025	1,039	716	1,018	729	606	795	765	860	914
Indiana	1,000	1,010	698	934	622	571	738	779	934	991
Iowa	628	615	455	653	398	334	498	452	464	522
Kansas	673	709	526	650	422	377	443	496	580	540
Kentucky	796	804	659	718	625	684	735	810	966	1,039
Maryland	802	808	560	726	392	318	608	565	753	836
Michigan	571	573	474	691	516	429	593	536	512	437
Missouri	587	591	427	596	415	326	477	415	527	571
Montana	1,019	994	785	1,048	654	704	896	909	1,136	1,157
New Mexico	970	982	838	985	536	779	708	662	742	890
North Dakota	963	869	784	818	813	769	837	925	1,013	1,064
Ohio	895	946	723	890	617	492	742	689	707	723
Oklahoma	516	570	450	586	380	356	398	379	413	526
Pennsylvania, bituminous	991	1,024	864	966	609	592	882	772	873	981
Tennessee	594	639	452	580	431	422	536	487	656	728
Texas	538	574	461	547	336	389	484	523	478	661
Utah	1,184	1,235	1,201	1,333	922	1,057	1,077	1,037	1,056	1,234
Virginia	903	935	805	803	628	779	832	843	936	1,027
Washington	755	799	594	752	560	575	680	688	681	717
West Virginia	978	1,005	835	869	715	729	919	995	1,111	1,209
Wyoming	1,165	1,249	991	1,237	849	659	1,004	950	1,051	1,111
Total bituminous	915	942	749	881	627	609	801	781	884	966
Pennsylvania anthracite	[2] 646	[2] 672	570	[2] 618	567	[2] 349	592	550	386	511
Grand total	860	890	713	839	615	565	763	733	777	867

[1] Probably too high because of practice common in some districts of men going into mine to shoot coal and load mine cars on days when tipples or mines, as a whole, are not in operation.
[2] Heavy washery output.

TABLE 35.—*Coal produced from deep mines per man employed underground per day worked, 1911–1926, in net tons* [1]

Year	Anthracite	Bituminous	Year	Anthracite	Bituminous
1911	2.75	4.01	1919	2.81	4.64
1912	2.69	4.24	1920	2.93	4.80
1913	2.67	4.16	1921	2.70	4.86
1914	2.67	4.28	1922	2.87	4.98
1915	2.78	4.49	1923	[2] 2.70	5.15
1916	2.74	4.57	1924	[2] 2.53	5.17
1917	2.89	4.51	1925	[2] 2.60	5.09
1918	2.94	4.62	1926	[2] 2.53	5.07

[1] In making this computation certain estimates had to be made of the division of workers above and below ground and of the production of strip pits in the years 1911 to 1913. The probable error introduced by these estimates is too small to impair the value of the averages.

[2] Beginning with 1923, a small tonnage of culm-bank coal handled through breakers and hitherto counted as fresh-mined coal has been excluded, and the figures are therefore not exactly comparable with earlier years. The difference, however, is small. (See p. 564.)

STRIKES, SUSPENSIONS, AND LOCKOUTS

TABLE 36.—*Men idle in strikes, suspensions, and lockouts and time lost thereby in comparison with time lost for other causes, 1917–1926*

[Includes both anthracite and bituminous coal mines]

Year	Number of men on strike	Average number of days lost—		Man days lost—		
		Per man striking	Per man employed	On account of strikes, suspensions, and lockouts	On account of no market, car shortage, and similar difficulties [1]	Total
1917	160,240	15	3	2,348,399	40,401,898	42,750,297
1918	79,395	6	1	508,526	38,001,284	38,509,810
1919	453,418	35	20	15,761,410	61,023,906	76,785,316
1920	282,419	21	8	5,914,473	55,732,698	61,647,171
1921	151,263	21	4	3,106,103	108,332,246	111,438,349
1922	603,031	122	87	73,497,043	65,186,691	138,683,734
1923	197,214	20	4	3,868,543	93,359,474	97,228,017
1924	129,452	41	7	5,362,748	84,963,306	90,326,054
1925	186,369	88	22	16,433,036	69,624,737	86,057,773
1926	174,724	38	9	6,707,778	58,424,553	65,132,331

[1] Computed by the Bureau of Mines from the operators' reports of time worked, on the assumption that the potential working time was 308 days. Beginning with 1925, however, the potential working time in the anthracite region has been assumed to be 304 days.

TABLE 37.—*Strikes, suspensions, and lockouts in coal mines, by States, in 1926*

State	Total number of men employed	Number of men on strike	Man days idle on account of strike	Average number of days lost on account of strike	
				Per man employed	Per man on strike
Alabama	27,345				
Arkansas	3,589	205	1,635	(1)	8
Colorado	12,815				
Illinois	75,870	987	12,609	(1)	13
Indiana	23,404	10,450	179,375	8	17
Iowa	8,869	932	19,510	2	21
Kansas	8,172	118	1,560	(1)	13
Kentucky	60,578	688	13,170	(1)	19
Maryland	3,681	603	3,289	1	5
Michigan	1,573	225	225	(1)	1
Missouri	5,270	64	760	(1)	12
Montana	2,419	225	450	(1)	2
New Mexico	3,167				
North Dakota	1,288				
Ohio	38,547	6,857	85,118	2	12
Oklahoma	5,400	20	20	(1)	1
Pennsylvania, bituminous	155,999	4,922	272,918	2	55
Tennessee	7,948	300	300	(1)	1
Texas	1,650				
Utah	3,545				
Virginia	13,764				
Washington	3,609				
West Virginia	118,726	2,692	126,242	1	47
Wyoming	5,862				
Other States	557	60	120	(1)	2
Total bituminous	593,647	29,348	717,301	1	24
Pennsylvania anthracite	165,386	145,376	5,990,477	36	41
Grand total	759,033	174,724	6,707,778	9	38

[1] One-half day or less.

MINING METHODS

TABLE 38.—*Bituminous coal mined by different methods, by States, in 1926. (See also fig. 13)*

State	Mined by hand		Shot off the solid		Cut by machines	
	Net tons	Per cent	Net tons	Per cent	Net tons	Per cent
Alabama	2,481,906	11.8	6,253,483	29.8	11,903,823	56.7
Alaska	8,700	10.0	78,600	90.0		
Arizona	624	100.0				
Arkansas	2,107	.1	646,985	44.4	611,630	41.9
Colorado	4,214,801	39.6	815,985	7.7	5,511,248	51.8
Illinois	2,851,240	4.1	11,049,518	15.9	51,733,782	74.6
Indiana	491,887	2.1	4,407,135	19.0	14,609,082	63.0
Iowa	441,004	9.5	2,966,132	64.2	1,092,282	23.6
Kansas	89,000	2.0	2,635,150	59.7	242,152	5.5
Kentucky:						
Eastern	999,235	2.1	3,016,929	6.3	43,407,236	91.5
Western	84,390	.5	1,201,862	7.8	13,182,845	85.3
Maryland	2,025,296	65.8	111,120	3.6	919,888	29.9
Michigan			4,000	.6	682,707	99.4
Missouri	407,537	13.5	291,173	9.7	924,518	30.7
Montana	161,071	5.8	537,550	19.2	1,352,868	48.4
New Mexico	1,010,932	35.9	682,160	24.2	1,116,859	39.6
North Carolina	48,939	84.5	9,000	15.5		
North Dakota	6,880	.5	195,326	14.2	539,717	39.4
Ohio	482,055	1.7	405,916	1.5	24,163,679	86.7
Oklahoma	8,100	.3	768,335	27.0	1,610,229	56.6
Pennsylvania	49,467,881	32.3	4,528,874	3.0	97,227,175	63.5
Tennessee	777,065	13.4	2,021,497	34.9	2,968,269	51.3
Texas	459,275	42.1	304,634	27.9	51,732	4.7
Utah	453,575	10.4	[1] 765,656	17.5	3,154,562	72.1
Virginia	197,167	1.4	2,273,795	16.1	11,654,014	82.4
Washington	1,623,594	62.8	729,465	28.2	220,319	8.5
West Virginia	21,308,005	14.8	3,737,378	2.6	118,232,943	82.4
Wyoming	664,628	10.2	1,989,548	30.6	3,799,121	58.3
Other States	6,000	32.1	12,708	67.9		
	90,772,894	15.8	52,439,914	9.1	410,912,680	71.7

[1] Includes 695,391 tons reported by the companies as "pillar coal," the method of mining which, of course, differs materially from solid shooting in rooms or entries. Indeed, most of the coal reported as shot off the solid in Utah is probably "pillar coal."

TABLE 38.—*Bituminous coal mined by different methods, by States, in 1926. (See also fig. 13)*—Continued

State	From strip pits		Not specified		Total production (net tons)
	Net tons	Per cent	Net tons	Per cent	
Alabama	332,499	1.6	29,251	0.1	21,000,962
Alaska					87,300
Arizona					624
Arkansas	198,095	13.6	200		1,459,017
Colorado			95,191	.9	10,637,225
Georgia	59,869	100.0			59,869
Illinois	3,466,098	5.0	266,285	.4	69,366,923
Indiana	3,617,236	15.6	60,666	.3	23,186,006
Iowa			126,069	2.7	4,625,487
Kansas	1,282,426	29.0	167,752	3.8	4,416,480
Kentucky:					
Eastern			37,039	.1	47,460,439
Western	988,566	6.4	6,360		15,464,023
Maryland			22,049	.7	3,078,353
Michigan					686,707
Missouri	1,243,723	41.4	141,544	4.7	3,008,495
Montana	730,677	26.1	15,594	.5	2,797,760
New Mexico			7,972	.3	2,817,923
North Carolina					57,939
North Dakota	509,219	37.2	119,102	8.7	1,370,244
Ohio	2,538,455	9.1	282,383	1.0	27,872,488
Oklahoma	454,574	16.0	1,435	.1	2,842,673
Pennsylvania	1,012,400	.7	805,308	.5	153,041,638
South Dakota			14,428	100.0	14,428
Tennessee	4,600	.1	17,310	.3	5,788,741
Texas	275,517	25.3			1,091,158
Utah					4,373,793
Virginia			8,410	.1	14,133,386
Washington			13,190	.5	2,586,568
West Virginia	155,882	.2	75,132		143,509,340
Wyoming	52,859	.8	6,132	.1	6,512,288
Other States					18,708
	16,922,695	3.0	2,318,802	.4	573,366,985

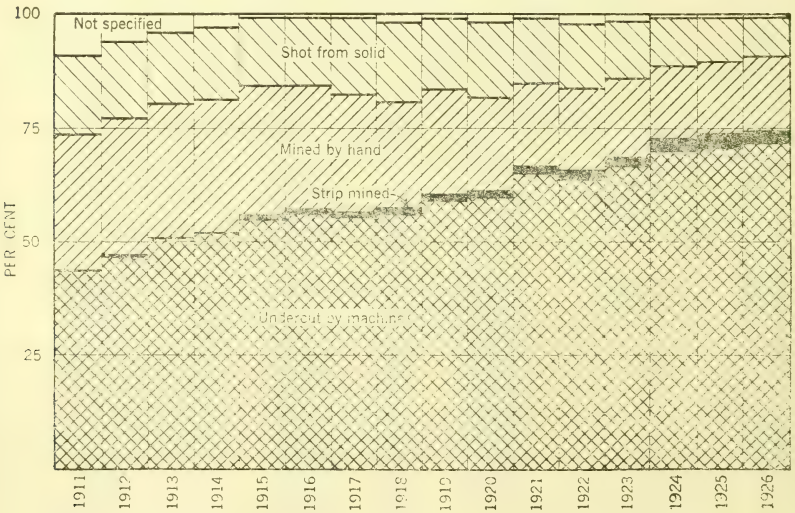

FIGURE 13.—Per cent of total output of bituminous coal mined by different methods

UNDERCUTTING MACHINES

TABLE 39.—*Number of coal-cutting machines in bituminous coal mines, average output per machine, and per cent of total product cut by machines, by States, 1913, 1923, 1925, and 1926*

State	Number of coal-cutting machines in use				Average output per machine (net tons)				Per cent of total product cut by machines			
	1913	1923	1925	1926	1913	1923	1925	1926	1913	1923	1925	1926
Alabama	377	395	422	437	10,940	22,067	25,105	27,240	23.3	42.6	53.0	56.7
Arkansas	27	40	87	105	9,300	4,769	6,176	5,825	11.2	14.6	44.0	41.9
Colorado	300	440	404	402	7,705	11,129	13,460	13,710	25.0	47.3	52.7	51.8
Illinois	1,845	3,151	2,551	2,428	17,686	17,191	19,040	21,307	53.0	68.3	72.6	74.6
Indiana	732	852	688	637	13,302	16,107	18,787	22,934	56.7	54.3	60.9	63.0
Iowa	28	81	67	78	4,311	14,584	13,767	14,004	1.6	20.7	19.6	23.6
Kansas	9	22	32	39	2,458	4,452	6,191	6,209	.3	2.2	4.4	5.5
Kentucky	1,263	1,928	1,926	1,959	11,365	19,559	25,210	28,887	73.2	84.2	88.2	89.9
Maryland	13	47	51	50	6,384	12,398	16,289	18,398	1.7	25.5	30.8	29.9
Michigan	130	80	63	62	6,636	13,579	12,440	11,011	70.0	92.7	97.0	99.4
Missouri	104	135	98	93	8,307	7,450	9,306	9,941	20.0	29.6	33.9	30.7
Montana	97	95	81	78	11,099	15,746	19,203	17,344	33.2	47.5	51.1	48.3
New Mexico	44	107	87	91	11,297	7,960	10,298	12,273	13.4	29.2	35.0	39.6
North Carolina		1	1			5,000	1,000			13.9	1.5	
North Dakota	13	25	25	26	17,094	17,040	17,619	20,758	44.9	30.8	33.3	39.4
Ohio	1,681	2,351	1,467	1,627	19,418	15,260	16,125	14,852	90.2	88.5	84.4	86.7
Oklahoma	103	183	168	151	6,511	8,943	7,899	10,664	16.1	56.7	57.0	56.6
Pennsylvania	6,301	6,481	5,088	5,037	14,678	17,020	17,094	19,303	53.2	64.1	63.5	63.5
Tennessee	252	171	150	144	7,312	11,692	17,026	20,613	26.7	33.1	46.8	51.3
Texas	24	5	8	4	4,204	8,904	16,972	12,933	4.2	3.8	13.5	4.7
Utah	50	192	203	187	12,510	16,778	17,130	16,869	19.2	68.3	74.1	72.1
Virginia	187	277	280	269	22,497	31,210	37,401	43,323	47.6	73.5	81.8	82.5
Washington	63	26	14	14	4,453	9,726	9,911	15,737	7.2	8.6	5.5	8.5
West Virginia	2,539	3,936	3,381	3,341	15,500	21,592	29,810	35,388	55.3	78.7	82.4	82.4
Wyoming	195	208	209	207	15,645	18,237	19,347	18,353	41.3	50.1	61.7	58.3
Other States	2				600				4.8			
	16,379	21,229	17,551	17,466	14,801	17,779	20,895	23,526	50.7	66.9	70.6	71.7

TABLE 40.—*Coal mined by undercutting machines, 1917–1926*

Year	Anthracite				Bituminous			
	Machines in use	Quantity mined by undercutting machines (net tons)		Per cent of total fresh-mined product cut by machines	Machines in use	Quantity mined by undercutting machines (net tons)		Per cent of total product cut by machines
		Total	Average per machine			Total	Average per machine	
1917	155	1,955,223	12,614	2.1	17,235	306,396,127	17,777	55.5
1918	176	1,857,514	10,554	2.1	18,463	323,931,133	17,545	55.9
1919	(1)	1,575,205	(1)	1.9	18,959	276,019,799	14,559	59.2
1920	139	938,073	6,749	1.1	19,103	339,813,476	17,788	59.8
1921	114	979,145	8,589	1.1	19,618	272,702,389	13,901	65.6
1922	82	502,793	6,132	1.0	20,436	267,032,931	13,067	63.2
1923	162	1,208,542	7,460	1.4	21,229	377,435,543	17,779	66.9
1924	212	1,423,884	6,716	1.7	18,660	336,271,335	18,021	69.5
1925	159	941,189	5,919	1.6	17,551	366,725,758	20,895	70.6
1926	90	931,650	10,352	1.2	17,466	410,912,680	23,526	71.7

[1] Not available.

STRIPPING OPERATIONS

TABLE 41.—*Coal recovered from strip pits, 1914–1926*

Year	Pennsylvania anthracite				Bituminous coal				Total			
	Number of power shovels in use	Quantity mined by stripping (net tons)		Per cent of fresh-mined total that was stripped	Number of power shovels in use	Quantity mined by stripping (net tons)[1]		Per cent of total that was stripped	Number of power shovels in use	Quantity mined by stripping (net tons)		Per cent of fresh-mined total that was stripped
		Total	Average per shovel			Total	Average per shovel			Total	Average per shovel	
1914	[2]	[2]	[2]	[2]	48	1,280,946	26,686	0.3	[2]	[2]	[2]	[2]
1915	57	1,121,603	19,677	[2]	87	2,831,619	32,547	.6	144	3,953,222	27,453	0.7
1916	105	1,987,800	18,930	1.4	111	3,933,395	35,436	.8	216	5,921,195	27,413	1.0
1917	76	2,301,588	30,284	2.5	182	5,789,977	31,813	1.0	258	8,091,565	31,363	1.2
1918	82	2,360,183	28,783	2.6	276	8,288,245	30,030	1.4	358	10,648,428	29,744	1.6
1919	89	2,006,879	22,549	2.4	287	5,634,951	19,634	1.2	376	7,641,830	20,324	1.4
1920	96	2,054,441	21,400	2.5	312	8,859,553	28,396	1.5	408	10,913,994	26,750	1.7
1921	85	2,027,790	23,856	2.3	279	4,699,511	16,844	1.1	364	6,727,301	18,482	1.3
1922	69	949,745	13,764	1.9	379	9,886,431	26,086	2.3	448	10,836,176	24,188	2.3
1923	95	2,263,098	23,822	2.7	442	11,844,347	26,797	2.1	537	14,107,445	26,271	2.1
1924	95	1,865,677	19,639	2.2	420	13,606,954	32,398	2.8	515	15,472,631	30,044	2.7
1925	97	1,578,478	16,273	2.7	389	16,870,907	43,370	3.2	486	18,449,385	37,962	3.2
1926	99	2,401,356	24,256	3.0	410	16,922,695	41,275	3.0	509	19,324,051	37,965	3.0

[1] For the years 1914 to 1923, inclusive, the figures of quantity mined by stripping do not include a small amount which was stripped by some other means than steam shovels, so for these years the tonnages are slightly less than the total recovered by stripping shown in some of the tables in earlier reports of this series.

[2] Not available.

TABLE 42.—*Summary of stripping operations that produced bituminous coal in 1926*

[For mines that recover coal both by stripping and by underground operations the returns do not permit separating men engaged in stripping from those engaged in other work. For this reason the figures of men employed represent all persons working at these mines, including those underground. The total tons produced by both methods at these same mines are also shown]

State and county	Number of strip pits	Number of shovels	Coal produced (net tons)		Total value at same mines	Average value per ton	Number of employees				Average number of days worked	Per cent of county or State total that was mined by stripping	Average tons per man per day
			Mined by stripping	Total at same mines			Underground		Surface	Total			
							Miners, loaders, and shot firers	All others [1]					
Alabama: Walker and Winston	10	17	332,499	651,596	$1,288,000	$1.98	237	60	435	732	220	[2] 5.2	4.06
Arkansas:													
Franklin	3	7	131,143	131,143	433,000	3.30	.....	.....	190	190	128	58.3	5.37
Johnson	3	4	66,952	66,952	285,000	4.26	.....	.....	95	95	69	19.9	10.22
State total	6	11	198,095	198,095	718,000	3.62	.....	.....	285	285	109	13.6	6.40
Georgia: Walker	1	3	59,869	59,869	173,000	2.89	.....	.....	127	127	253	100.0	1.86
Illinois:													
Edgar, Fulton, Jackson, La Salle, and St. Clair	9	35	1,806,537	1,806,537	2,972,000	1.64	.....	.....	770	770	136	23.5	17.26
Perry	3	9	560,715	560,715	992,000	1.77	.....	.....	170	170	141	24.2	23.39
Vermilion	9	15	500,600	538,894	1,156,000	2.07	75	11	420	506	167	19.4	6.62
Williamson	3	7	598,246	598,246	1,142,000	1.91	.....	.....	150	150	232	7.4	17.17
State total	24	66	3,466,098	3,524,392	6,262,000	1.78	75	11	1,510	1,596	155	5.0	14.22
Indiana:													
Clay	7	18	577,508	577,508	1,057,000	1.83	.....	.....	293	293	211	49.1	9.35
Greene	3	6	241,599	241,599	373,000	1.54	.....	.....	120	120	83	18.9	24.26
Owen	3	4	67,494	67,494	116,000	1.72	.....	.....	83	83	166	86.7	4.91
Pike	4	15	1,644,164	1,644,164	2,916,000	1.77	.....	.....	531	531	236	63.3	13.13
Sullivan	3	5	396,913	396,913	809,000	2.04	.....	.....	239	239	216	8.5	7.69
Vermilion, Vigo, and Warrick	5	13	689,558	689,558	1,125,000	1.63	.....	.....	309	309	155	8.0	14.37
State total	25	61	3,617,236	3,617,236	6,396,000	1.77	.....	.....	1,575	1,575	197	15.6	11.66

[1] Includes haulage and trackmen.

[2] Per cent of county totals, not State.

TABLE 42.—*Summary of stripping operations that produced bituminous coal in 1926*—Continued

State and county	Number of strip pits	Number of shovels	Coal produced (net tons)		Total value at same mines	Average value per ton	Number of employees				Average number of days worked	Per cent of county or State total that was mined by stripping	Average tons per man per day
			Mined by stripping	Total at same mines			Underground		Surface	Total			
							Miners, loaders, and shot firers	All others					
Kansas:													
Cherokee	17	19	672,483	672,483	$1,605,000	$2.39	.....	.....	375	375	117	64.1	15.33
Crawford	28	20	609,943	609,943	1,708,000	2.80	.....	.....	450	450	148	19.7	9.15
State total	45	39	1,282,426	1,282,426	3,313,000	2.58	.....	.....	825	825	134	29.0	11.60
Kentucky:													
Hopkins	8	24	941,468	1,058,390	1,417,000	1.34	73	38	520	631	203	19.3	8.26
Muhlenberg and Ohio	2	4	47,098	47,098	62,000	1.32	.....	.....	100	100	40	.8	11.77
State total	10	28	988,566	1,105,488	1,479,000	1.34	73	38	620	731	181	1.6	8.37
Missouri:													
Barton	14	17	953,019	953,019	2,609,000	2.74	.....	.....	504	504	170	83.4	11.11
Bates	4	5	177,421	177,421	361,000	2.03	.....	.....	126	126	196	73.1	7.19
Callaway, Henry, St. Clair, and Vernon	6	6	113,283	113,283	295,000	2.60	.....	.....	144	144	184	73.6	4.28
State total	24	28	1,243,723	1,243,723	3,265,000	2.63	.....	.....	774	774	177	41.4	9.08
Montana: Rosebud	1	3	730,677	730,677	1,094,000	1.50	.....	.....	71	71	216	[2] 100.0	47.64
North Dakota:													
Bowman, Divide, Hettinger, and Mercer	4	5	120,426	120,426	180,000	1.50	.....	.....	52	52	130	26.3	17.84
Burke	6	8	336,230	336,230	636,000	1.89	.....	.....	156	156	178	100.0	12.08
McLean	3	2	52,563	52,563	107,000	2.04	.....	.....	63	63	114	55.8	7.29
State total	13	15	509,219	509,219	923,000	1.81	.....	.....	271	271	154	37.2	12.18
Ohio:													
Athens, Carroll, Columbiana, Muskingum, and Perry	8	14	258,425	272,333	495,000	1.82	24	7	128	159	189	4.8	9.07
Harrison	16	32	1,667,257	1,668,657	2,624,000	1.57	12	.....	837	849	164	63.2	12.01

Jefferson	5	15	592,482	643,274	1,005,000	1.56	40	11	308	359	226	11.5	7.91
Tuscarawas	3	3	20,291	32,265	74,000	2.29	8	3	5	16	282	1.6	7.14
State total	32	64	2,538,455	2,616,529	4,198,000	1.60	84	21	1,278	1,383	184	9.1	10.27
Oklahoma:													
Craig, Haskell, Muskogee, Rogers, and Wagoner	6	12	287,378	287,378	777,000	2.70			346	346	207	88.1	4.00
Tulsa	3	6	167,196	169,222	544,000	3.21	11	3	214	228	202	52.0	3.67
State total	9	18	454,574	456,600	1,321,000	2.89	11	3	560	574	205	16.0	3.87
Pennsylvania:													
Allegheny	5	9	131,878	162,816	328,000	2.01	20	10	105	135	170	1.0	7.10
Beaver, Cambria, Center, Clarion, Clinton, and Jefferson	7	10	295,902	380,631	681,000	1.79	89	14	169	272	250	1.2	5.61
Clearfield	3	4	17,731	24,245	53,000	2.19	44	4	28	76	81	.3	3.95
Fayette	3	2	114,846	1,156,259	2,822,000	2.44	242	199	171	612	267	.3	7.07
Washington	7	14	129,817	270,503	535,000	1.98	292	36	235	563	79	.7	6.06
Westmoreland	7	10	322,226	471,411	828,000	1.76	95	29	174	298	237	1.5	6.67
State total	32	49	1,012,400	2,465,865	5,247,000	2.13	782	292	882	1,956	192	.7	6.56
Other States [3]	5	8	488,858	591,097	923,000	1.56	95	37	113	245	204	[2] 5.1	11.85
Grand total	237	410	16,922,695	19,052,812	36,600,000	1.92	1,357	462	9,326	11,145	181	3.0	9.45

[2] Per cent of county totals, not State.

[3] Tennessee, Texas, West Virginia, and Wyoming.

UNDERGROUND LOADING MACHINES

TABLE 43.—*Mechanical loading underground in bituminous coal mines in 1926*

[The table covers all devices by which most of coal handled is loaded without hand shoveling. It does not cover mine carloaders and conveyors on which all the coal has to be shoveled by hand, although it should be remembered that such devices, by reducing the height to which the miner must lift the coal, greatly reduce the labor of hand shoveling]

	Mines that reported loading by machine						Other mines, reporting loading machines but not tonnage [1]	
	Number of mines	Number of loading machines	Net tons loaded by machine	Total production of these mines		Per cent of total output loaded by machine	Mines	Machines
				Net tons, including hand loading	Per cent loaded by machine			
By States:								
Alabama	3	30	111,803	458,455	24.4	0.5	1	(2)
Colorado	3	(2)	(2)	(2)	(2)	(2)	2	(2)
Illinois	18	107	2,035,521	8,050,665	25.3	2.9	1	(2)
Indiana	13	87	2,166,737	2,423,681	89.4	9.3	-------	-------
Iowa	6	8	84,325	949,732	8.9	1.8	1	(2)
Kentucky	10	20	181,763	4,288,921	4.2	.3	5	5
Maryland	1	(2)	(2)	(2)	(2)	(2)	-------	-------
Michigan	2	(2)	(2)	(2)	(2)	(2)	-------	-------
New Mexico	1	(2)	(2)	(2)	(2)	(2)	-------	-------
North Dakota	1	(2)	(2)	(2)	(2)	(2)	-------	-------
Ohio	3	10	122,576	1,303,590	9.4	.4	2	(2)
Pennsylvania	20	48	855,578	5,512,447	15.5	.6	4	5
Tennessee	2	(2)	(2)	(2)	(2)	(2)	2	(2)
Utah	6	8	114,619	1,214,530	9.4	2.6	1	(2)
Virginia	6	17	1,086,480	3,391,417	32.0	7.7	2	(2)
West Virginia	29	57	2,000,636	9,354,888	21.4	1.4	12	18
Wyoming	7	44	1,142,304	1,796,396	63.6	17.6	-------	-------
Undistributed	-------	19	119,853	1,584,411	7.6	.5	-------	15
	131	455	10,022,195	40,329,133	24.9	1.8	33	43
By methods:								
Scraper loaders	50	133	1,554,372	40,329,133	24.9	.3	13	16
Shaking-shovel and "self-loading" conveyors [3]	10	27	681,463			.1	-------	-------
Other loaders [4]	71	295	7,786,360			1.4	20	27
	131	455	10,022,195	40,329,133	24.9	1.8	33	43

[1] In practically all of these the use of loading machines was in the experimental stage only.
[2] Included under "Undistributed" to avoid disclosing individual operations.
[3] Includes shaking-trough conveyors equipped with shovel attachment on front end (so-called "duckbills"), on which reports indicated 60 to 90 per cent loaded without hand shoveling, and also two makes of long-face conveyors designed to receive coal as shot down, on which a large part of the coal (sometimes more than half) is loaded without hand shoveling. These types can not be shown separately without disclosing individual operations.
[4] Includes mobile digging and loading machines and cutting and loading machines.

NUMBER AND SIZE OF MINES

TABLE 44.—*Number and production of commercial bituminous coal mines, by size classes, in 1926*

[No canvass of wagon mines was made]

State	Class 1A (more than 500,000 tons)					Class 1B (200,000 to 500,000 tons)					Class 2 (100,000 to 200,000 tons)					Class 3 (50,000 to 100,000 tons)				
	Mines		Production			Mines		Production			Mines		Production			Mines		Production		
	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent
Alabama	4	1.8	3,079,065	769,766	14.7	25	11.0	7,289,273	291,571	34.7	42	18.5	5,657,795	134,709	26.9	41	18.0	3,070,840	74,899	14.6
Alaska																				
Arizona																				
Arkansas																7	7.1	484,056	69,151	33.2
California, Idaho, and Oregon																				
Colorado						17	7.7	4,834,694	284,394	45.5	19	8.6	2,494,101	131,269	23.4	25	11.3	1,817,895	72,715	17.1
Georgia																1	100.0	59,869	59,869	100.0
Illinois	48	9.3	43,392,823	904,017	62.6	48	9.3	14,736,140	307,003	21.2	37	7.2	5,573,161	150,626	8.0	39	7.6	2,909,279	74,597	4.2
Indiana	5	2.4	3,556,768	711,354	15.3	36	17.6	12,470,949	346,415	53.8	31	15.1	4,323,190	139,458	18.6	20	9.8	1,481,182	74,059	6.4
Iowa						7	3.6	1,850,677	264,382	40.0	4	2.1	627,425	156,856	13.6	13	6.7	959,994	73,846	20.8
Kansas						1	.4	285,332	285,332	6.5	10	4.0	1,236,701	123,670	28.0	16	6.3	1,100,369	68,773	24.9
Kentucky:																				
Eastern	8	1.7	6,147,684	768,460	13.0	61	12.6	17,653,307	289,398	37.2	92	19.0	13,064,899	142,009	27.5	96	19.9	6,790,304	70,732	14.3
Western						25	16.5	7,052,037	282,081	45.6	36	23.7	5,330,696	148,075	34.5	25	16.4	1,815,703	72,628	11.7
Maryland						2	2.1	438,876	219,438	14.2	7	7.2	957,316	136,759	31.1	14	14.4	981,009	70,072	31.9
Michigan						1	11.1	200,478	200,478	29.2	2	22.2	275,375	137,688	40.1	2	22.2	121,781	60,891	17.7
Missouri											6	3.6	837,082	139,514	27.8	7	4.2	534,619	76,374	17.8
Montana	2	4.4	1,254,831	627,415	44.8	2	4.4	638,295	319,148	22.8	4	8.9	505,538	126,385	18.1	1	2.2	90,237	90,237	3.2
New Mexico						3	8.6	1,008,682	336,227	35.8	7	20.0	1,053,907	150,558	37.4	8	22.8	608,627	76,078	21.6
North Carolina																				
North Dakota						1	.7	209,166	209,166	15.3	3	2.0	496,373	165,457	36.2	1	.6	89,682	89,682	6.5
Ohio	3	.5	2,051,977	683,992	7.3	39	6.2	11,726,714	300,685	42.1	37	5.9	5,214,299	140,927	18.7	56	9.0	3,913,071	69,876	14.0
Oklahoma						1	.9	233,512	233,512	8.2	4	3.5	490,669	122,667	17.3	13	11.3	924,781	71,137	32.5
Pennsylvania	62	3.2	48,531,012	782,758	31.7	137	6.9	43,622,623	318,413	28.5	187	9.5	26,060,899	139,363	17.1	229	11.7	16,560,151	72,315	10.8
South Dakota																				
Tennessee						4	4.3	1,049,586	262,397	18.1	17	18.3	2,609,430	153,496	45.1	20	21.5	1,324,148	66,207	22.9
Texas											1	3.1	196,669	196,669	18.0	3	9.4	206,313	68,771	18.9
Utah						8	21.0	2,608,826	326,103	59.7	11	28.9	1,449,365	131,760	33.1	2	5.3	153,737	76,869	3.5
Virginia	7	6.4	4,754,873	679,267	33.7	19	17.4	5,436,933	286,154	38.5	13	11.9	1,838,829	141,448	13.0	16	14.7	1,192,775	74,548	8.4
Washington						5	9.8	1,443,723	288,745	55.8	3	5.9	466,252	155,417	18.0	5	9.8	340,940	68,188	13.2
West Virginia	35	2.9	22,774,582	650,702	15.9	199	16.6	60,242,300	302,725	42.0	254	21.2	37,038,433	145,821	25.3	195	16.2	14,205,954	72,851	9.9
Wyoming						8	13.1	2,471,079	308,885	37.9	18	29.5	2,799,326	155,518	43.0	12	19.7	912,786	76,066	14.0
	174	2.4	135,543,615	778,986	23.6	649	9.1	197,503,202	304,319	34.5	845	11.8	120,597,730	142,719	21.0	867	12.1	62,650,102	72,261	10.9

TABLE 44.—*Number and production of commercial bituminous coal mines, by size classes, in 1926*—Continued

State	Class 4 (10,000 to 50,000 tons)					Class 5 (less than 10,000 tons)					Total		
	Mines		Production			Mines		Production			Mines	Production (net tons)	
	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent	Number	Per cent	Total (net tons)	Average per mine (net tons)	Per cent		Total	Average per mine
Alabama	68	30.0	1,726,359	25,388	8.2	47	20.7	177,630	3,779	0.9	227	21,000,962	92,515
Alaska	4	66.7	86,700	21,675	99.3	2	33.3	600	300	.7	6	87,300	14,550
Arizona						1	100.0	624	624	100.0	1	624	624
Arkansas	31	31.3	775,223	25,007	53.1	61	61.6	199,738	3,274	13.7	99	1,459,017	14,738
California, Idaho, and Oregon						5	100.0	18,708	3,742	100.0	5	18,708	3,742
Colorado	42	19.0	1,175,888	27,997	11.0	118	53.4	314,647	2,667	3.0	221	10,637,225	48,132
Georgia											1	59,869	59,869
Illinois	81	15.7	2,013,536	24,858	2.9	262	50.9	741,984	2,832	1.1	515	69,366,923	134,693
Indiana	48	23.4	1,083,928	22,582	4.7	65	31.7	269,989	4,154	1.2	205	23,186,006	113,102
Iowa	30	15.6	811,293	27,043	17.5	139	72.0	376,098	2,706	8.1	193	4,625,487	23,966
Kansas	56	22.2	1,255,423	22,418	28.4	169	67.1	538,655	3,187	12.2	252	4,416,480	17,526
Kentucky:													
Eastern	133	27.5	3,424,542	25,748	7.2	93	19.3	379,703	4,083	.8	483	47,460,439	98,262
Western	49	32.2	1,208,935	24,672	7.8	17	11.2	56,652	3,332	.4	152	15,464,023	101,737
Maryland	23	23.7	554,303	24,100	18.0	51	52.6	146,849	2,879	4.8	97	3,078,353	31,736
Michigan	3	33.4	86,423	28,808	12.6	1	11.1	2,650	2,650	.4	9	686,707	76,301
Missouri	48	28.7	1,294,133	26,961	43.0	106	63.5	342,661	3,233	11.4	167	3,008,495	18,015
Montana	7	15.6	200,460	28,637	7.2	29	64.5	108,399	3,738	3.9	45	2,797,760	62,172
New Mexico	5	14.3	117,993	23,599	4.2	12	34.3	28,714	2,393	1.0	35	2,817,923	80,512
North Carolina	2	100.0	57,939	28,970	100.0						2	57,939	28,970
North Dakota	12	8.0	296,766	24,730	21.7	133	88.7	278,257	2,092	20.3	150	1,370,244	9,135
Ohio	171	27.4	3,837,189	22,440	13.8	319	51.0	1,129,238	3,540	4.1	625	27,872,488	44,596
Oklahoma	47	40.8	1,012,599	21,544	35.6	50	43.5	181,112	3,622	6.4	115	2,842,673	24,719
Pennsylvania	648	33.0	15,475,119	23,881	10.1	700	35.7	2,791,834	3,988	1.8	1,963	153,041,638	77,963
South Dakota						24	100.0	14,428	601	100.0	24	14,428	601
Tennessee	31	33.3	726,539	23,437	12.5	21	22.6	79,038	3,764	1.4	93	5,788,741	62,245
Texas	25	78.1	667,120	26,685	61.2	3	9.4	21,056	7,019	1.9	32	1,091,158	34,099
Utah	5	13.2	135,767	27,153	3.1	12	31.6	26,098	2,175	.6	38	4,373,793	115,100
Virginia	25	23.0	777,231	31,089	5.5	29	26.6	132,745	4,577	.9	109	14,133,386	129,664
Washington	12	23.5	254,070	21,173	9.8	26	51.0	81,583	3,138	3.2	51	2,586,568	50,717
West Virginia	297	24.7	8,268,165	27,839	5.7	221	18.4	979,906	4,434	.7	1,201	143,509,340	119,492
Wyoming	9	14.7	292,476	32,497	4.5	14	23.0	36,621	2,616	.6	61	6,512,288	106,759
	1,912	26.6	47,616,119	24,904	8.3	2,730	38.0	9,456,217	3,464	1.7	7,177	573,366,985	79,890

TABLE 45.—*Number and yearly output of commercial bituminous coal mines, by size classes, 1905, 1910, 1913, 1917–1926.*[1] *(See also fig. 14)*

[Exclusive of wagon mines]

Year	Class 1 (more than 200,000 tons) [2]	Class 2 (100,000 to 200,000 tons)	Class 3 (50,000 to 100,000 tons)	Class 4 (10,000 to 50,000 tons)	Class 5 (less than 10,000 tons)	Total
Number of mines:						
1905	411	612	808	1,514	1,715	5,060
1910	618	763	960	1,568	1,909	5,818
1913	694	837	959	1,558	1,728	5,776
1917	792	914	1,044	1,996	2,193	6,939
1918	821	929	1,198	2,636	2,735	8,319
1919	550	854	1,181	2,784	3,625	8,994
1920	701	1,031	1,279	3,160	2,750	8,921
1921	482	807	1,003	2,346	3,400	8,038
1922	416	848	1,084	3,139	3,812	9,299
1923	748	935	1,176	2,742	3,730	9,331
1924	646	819	943	2,047	3,131	7,586
1925	714	833	891	1,969	2,737	7,144
1926	823	845	867	1,912	2,730	7,177
Net tons produced:						
1905	126,499,000	85,920,000	57,386,000	38,995,000	6,034,000	314,834,000
1910	191,519,000	107,052,000	68,858,000	42,282,000	6,561,000	416,272,000
1913	241,463,000	118,476,000	69,018,000	42,292,000	6,280,000	477,529,000
1917	285,366,000	129,486,000	74,894,000	51,596,000	8,824,000	550,166,000
1918	281,267,000	131,027,000	87,143,000	67,453,000	11,387,000	578,277,000
1919	174,848,000	120,926,000	84,625,000	71,334,000	13,198,000	464,931,000
1920	237,468,000	142,750,000	90,669,000	82,129,000	10,716,000	563,732,000
1921	162,438,000	115,607,000	71,160,000	56,099,000	10,618,000	415,922,000
1922	131,876,000	117,195,000	77,287,000	77,203,000	15,248,000	418,809,000
1923	265,869,000	130,804,000	84,342,000	68,769,000	13,639,000	563,423,000
1924	237,338,000	115,217,000	67,967,000	52,606,000	10,559,000	483,687,000
1925	279,190,000	117,986,000	64,578,000	48,900,000	9,399,000	520,053,000
1926	333,047,000	120,598,000	62,650,000	47,616,000	9,456,000	573,367,000
Per cent of total number of mines:						
1905	8.1	12.1	16.0	29.9	33.9	100.0
1910	10.6	13.1	16.5	27.0	32.8	100.0
1913	12.0	14.5	16.6	27.0	29.9	100.0
1917	11.4	13.2	15.0	28.8	31.6	100.0
1918	9.8	11.2	14.4	31.7	32.9	100.0
1919	6.1	9.5	13.1	31.0	40.3	100.0
1920	7.9	11.6	14.3	35.4	30.8	100.0
1921	6.0	10.0	12.5	29.2	42.3	100.0
1922	4.5	9.1	11.7	33.7	41.0	100.0
1923	8.0	10.0	12.6	29.4	40.0	100.0
1924	8.5	10.8	12.4	27.0	41.3	100.0
1925	10.0	11.6	12.5	27.6	38.3	100.0
1926	11.5	11.8	12.1	26.6	38.0	100.0
Per cent of total tonnage:						
1905	40.2	27.3	18.2	12.4	1.9	100.0
1910	46.0	25.7	16.5	10.2	1.6	100.0
1913	50.6	24.8	14.4	8.9	1.3	100.0
1917	51.9	23.5	13.6	9.4	1.6	100.0
1918	48.6	22.7	15.1	11.6	2.0	100.0
1919	37.6	26.0	18.2	15.4	2.8	100.0
1920	42.1	25.3	16.1	14.6	1.9	100.0
1921	39.1	27.8	17.1	13.5	2.5	100.0
1922	31.5	28.0	18.5	18.4	3.6	100.0
1923	47.2	23.2	15.0	12.2	2.4	100.0
1924	49.0	23.8	14.1	10.9	2.2	100.0
1925	53.7	22.7	12.4	9.4	1.8	100.0
1926	58.1	21.0	10.9	8.3	1.7	100.0

[1] This table shows mines, not companies, and should not be confused with other tables that include country banks and many wagon mines shipping by rail.
[2] Figures for 1924–1926 include class 1A and 1B.

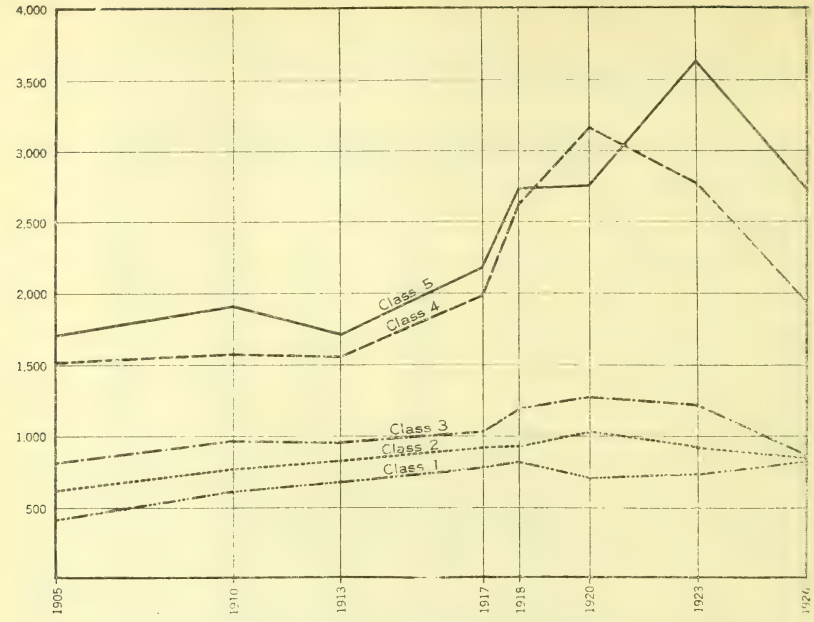

FIGURE 14.—Number of commercial bituminous coal mines in each size class, 1905–1926

TABLE 46.—*Number of mines operating and price of bituminous coal f. o. b. mines 1913, 1917–1926*

Year	Number of commercial bituminous mines in operation	Total number of bituminous mines in operation, including wagon mines	Average spot price f. o. b. mines (Coal Age)	Average sales realization per ton on all coal f. o. b. mines
1913	5,776	[1]	$1.23	$1.18
1917	6,939	10,634	3.25	2.26
1918	8,319	11,038	[2] 2.58	2.58
1919	8,994	12,409	2.59	2.49
1920	8,921	14,766	5.64	3.75
1921	8,038	[1]	2.55	2.89
1922	9,299	14,150	3.64	3.02
1923	9,331	11,715	2.77	2.68
1924	7,586	[1]	2.08	2.20
1925	7,144	[1]	2.06	2.04
1926	7,177	[1]	2.21	2.06

[1] Not available. [2] Price fixed by Fuel Administrator.

VALUE OF COAL PRODUCED

DEFINITION OF VALUES REPORTED

The value given in this report is the amount received at the mines f. o. b. cars minus the selling expense, and the average value per ton is the average amount received, obtained by dividing the total value by the number of tons sold or produced. Coal used at the mines, coal coked by the producing company, and coal used in some other industry by that company—in all, forming a considerable part of the total output—is not sold, and the value placed upon it is either

an estimate or the amount at which it is carried on the company's books. Either value is presumably the amount the coal would have brought if it had been sold or the amount other fuel for the purpose stated would have cost if it had been purchased. In other words, the values given represent returns to the operators for coal sold plus the estimated value of that not sold. The value thus fixed is more or less arbitrary and does not necessarily represent the current prices for coal sold commercially. Many mines are owned by consumers who take all or a great part of their output at nominal prices. The output of such "captive mines" was 22.7 per cent of the entire production in 1926. (Table 27.) Even where the coal is actually sold large quantities may be moved on "cost plus" contracts that provide for prices below the average spot prices in the field or the average prices received for coal delivered under ordinary contracts. The figures in the following tables, therefore, do not necessarily show prices or even an average of the prices of coal at the mines. Taken over a period of years, however, they do furnish an index to the rise and fall in the value of coal.

The computed "average value per ton" is thus affected by the value placed by the operator upon coal used at the mine but not shipped. In order to ascertain how large an influence the inclusion of this noncommercial coal might have upon the average, the operators were requested for several years to give separate statements of value for coal loaded at the mines for shipment, for sales to local trade, and for mine fuel and coal made into beehive coke.[32] It was found, however, that for practical purposes the average value of all the coal produced may be accepted as a measure of the average value of the coal shipped. The values placed by operators on mine fuel and upon the coal coked were generally somewhat less than the average amounts received for the coal shipped, but the quantities to which these lower values applied were so much smaller than the quantity shipped that they affected the average for all coal produced only slightly.[33]

ESTIMATES OF VALUE INCLUDED IN THE STATISTICS

If an operator who is known to have produced coal during the year will make no report of the value of his product to the Bureau of Mines, an estimate of the value is included in the total to make it complete. These estimates are based on the average for each county as obtained from all reports of the operators in the county that did specify value.

Of the $1,183,412,000 given as the total value of bituminous coal at the mines in 1926, fully $1,129,216,000 represents actual reports from the operators and $54,196,000 represents estimates made in the manner just described. The proportion actually reported is thus 95.4 per cent of the total, a proportion so high as to indicate that the results are thoroughly representative for the country as a whole. The percentage actually reported in each of the principal States is shown in Table 47.

[32] See Coal in 1919–1921, pp. 558–662, which gives details of values for each of these items in each county.
[33] Coal in 1922, p. 546.

TABLE 47.—*Per cent of total value of bituminous coal produced by commercial operators that is represented by actual reports from the operators, by States, in 1926*

State	Per cent	State	Per cent
Alabama	91.2	North Dakota	99.7
Arkansas	79.0	Ohio	96.8
Colorado	96.4	Oklahoma	82.8
Illinois	97.4	Pennsylvania	97.3
Indiana	93.1	Tennessee	99.6
Iowa	86.1	Texas	62.1
Kansas	79.7	Utah	100.0
Kentucky	88.1	Virginia	99.2
Maryland	96.1	Washington	73.1
Michigan	100.0	West Virginia	97.4
Missouri	99.4	Wyoming	99.4
Montana	99.7		
New Mexico	99.5	United States	95.4

Although the output of bituminous coal in 1926 exceeded that of 1923, the value of the product f. o. b. mines was less by $331,209,000. The average value per ton declined from $2.68 in 1923 to $2.06 in 1926, a decrease of 62 cents, or 23 per cent. Table 48 shows that the decrease in average value was almost universal, the only exceptions being North Carolina and South Dakota, where the tonnages involved were too small to be significant.

TABLE 48.—*Total and average value per net ton of coal at mines, by States, 1923 and 1926*

State	Total			Average per net ton		
	1923	1926	Increase or decrease	1923	1926	Increase or decrease
Alabama	$51,624,000	$48,036,000	−$3,588,000	$2.52	$2.29	−$0.23
Alaska	755,000	459,000	−296,000	6.30	5.26	−1.04
Arizona		1,000	+1,000		1.60	
Arkansas	5,192,000	5,497,000	+305,000	4.01	3.77	−.24
California, Idaho, and Oregon	79,000	70,000	−9,000	3.94	3.74	−.20
Colorado	33,299,000	29,529,000	−3,770,000	3.22	2.78	−.44
Georgia	327,000	173,000	−154,000	4.32	2.89	−1.43
Illinois	198,388,000	148,604,000	−49,784,000	2.50	2.14	−.36
Indiana	65,046,000	45,889,000	−19,157,000	2.48	1.98	−.50
Iowa	20,517,000	14,214,000	−6,303,000	3.59	3.07	−.52
Kansas	14,275,000	12,535,000	−1,740,000	3.21	2.84	−.37
Kentucky	113,542,000	109,740,000	−3,802,000	2.54	1.74	−.80
Maryland	6,911,000	6,800,000	−111,000	3.02	2.21	−.81
Michigan	5,545,000	2,829,000	−2,716,000	4.73	4.12	−.61
Missouri	11,575,000	8,951,000	−2,624,000	3.40	2.98	−.42
Montana	9,652,000	6,883,000	−2,769,000	3.07	2.46	−.61
New Mexico	10,668,000	8,916,000	−1,752,000	3.66	3.16	−.50
North Carolina	132,000	243,000	+111,000	3.66	4.19	+.53
North Dakota	3,275,000	2,378,000	−897,000	2.36	1.74	−.62
Ohio	98,610,000	54,759,000	−43,851,000	2.43	1.96	−.47
Oklahoma	10,874,000	9,042,000	−1,832,000	3.77	3.18	−.59
Pennsylvania, bituminous	472,217,000	325,618,000	−146,599,000	2.75	2.13	−.62
South Dakota	25,000	42,000	+17,000	2.41	2.91	+.50
Tennessee	16,515,000	10,975,000	−5,540,000	2.73	1.90	−.83
Texas	2,162,000	1,751,000	−411,000	1.82	1.60	−.22
Utah	13,657,000	10,362,000	−3,295,000	2.89	2.37	−.52
Virginia	32,468,000	27,203,000	−5,265,000	2.76	1.92	−.84
Washington	10,894,000	9,350,000	−1,544,000	3.72	3.61	−.11
West Virginia	285,481,000	264,736,000	−20,745,000	2.65	1.84	−.81
Wyoming	20,916,000	17,827,000	−3,089,000	2.76	2.74	−.02
Total bituminous	1,514,621,000	1,183,412,000	−331,209,000	2.68	2.06	−.62
Pennsylvania anthracite	506,787,000	474,164,000	−32,623,000	5.43	5.62	+.19
Grand total	2,021,408,000	1,657,576,000	−363,832,000	3.07	2.52	−.55

AVERAGE VALUE PER TON

TABLE 49.—*Average value per net ton of coal at mines, 1880–1926*

Year	Anthracite [1]	Bituminous	Year	Anthracite [1]	Bituminous	Year	Anthracite [1]	Bituminous
1880	$1.47	$1.25	1896	$1.50	$0.83	1912	$2.11	$1.15
1881	2.01	1.12	1897	1.51	.81	1913	2.13	1.18
1882	2.01	1.12	1898	1.41	.80	1914	2.07	1.17
1883	2.01	1.07	1899	1.46	.87	1915	2.07	1.13
1884	1.79	.94	1900	1.49	1.04	1916	2.30	1.32
1885	2.00	1.13	1901	1.67	1.05	1917	2.85	2.26
1886	1.95	1.05	1902	1.84	1.12	1918	3.40	2.58
1887	2.01	1.11	1903	2.04	1.24	1919	4.14	2.49
1888	1.91	1.00	1904	1.90	1.10	1920	4.85	3.75
1889	1.44	.99	1905	1.83	1.06	1921	5.00	2.89
1890	1.43	.99	1906	1.85	1.11	1922	5.01	3.02
1891	1.46	.99	1907	1.91	1.14	1923	5.43	2.68
1892	1.57	.99	1908	1.90	1.12	1924	5.43	2.20
1893	1.59	.96	1909	1.84	1.07	1925	5.30	2.04
1894	1.51	.91	1910	1.90	1.12	1926	5.62	2.06
1895	1.41	.86	1911	1.94	1.11			

[1] Averages for anthracite represent amounts per net ton and include all coal produced.

TABLE 50.—*Average value per net ton of coal at mines, by States, 1918–1926*

State	1918	1919	1920	1921	1922	1923	1924	1925	1926	
									Average	Increase or decrease
Alabama	$2.85	$2.96	$3.65	$3.08	$2.34	$2.52	$2.34	$2.12	$2.29	+$0.17
Alaska	5.45	5.66	5.83	6.46	5.43	6.30	5.62	4.89	5.26	+.37
Arkansas	3.67	3.70	4.56	4.37	4.14	4.01	4.06	3.96	3.77	−.19
California [1]	2.70	3.38	4.36	4.66	3.87	3.94	4.19	4.75	3.67	−1.08
Colorado	2.69	2.78	3.49	3.55	3.16	3.22	3.05	2.94	2.78	−.16
Georgia	3.59	3.71	5.00	2.14	4.06	4.32	3.62	3.32	2.89	−.43
Illinois	2.32	2.30	3.08	2.74	2.89	2.50	2.27	2.19	2.14	−.05
Indiana	2.29	2.22	3.16	2.57	2.85	2.48	2.16	2.02	1.98	−.04
Iowa	3.02	3.09	3.94	3.81	3.72	3.59	3.31	3.14	3.07	−.07
Kansas	2.91	3.05	3.87	3.85	3.66	3.21	3.03	2.88	2.84	−.04
Kentucky	2.55	2.46	4.11	2.69	3.02	2.54	1.88	1.72	1.74	+.02
Maryland	2.77	2.73	4.63	3.61	3.37	3.02	2.17	1.97	2.21	+.24
Michigan	3.83	3.88	4.93	4.87	5.05	4.73	4.33	4.20	4.12	−.08
Missouri	3.02	3.21	4.16	3.92	3.81	3.40	3.29	3.07	2.98	−.09
Montana	2.53	2.67	3.16	3.26	3.19	3.07	2.96	2.59	2.46	−.13
New Mexico	2.68	3.11	3.68	3.91	3.49	3.66	3.51	3.37	3.16	−.21
North Carolina	4.75	3.84	7.02	5.76	4.94	3.66	3.92	4.34	4.19	−.15
North Dakota	2.45	2.50	2.87	2.69	2.65	2.36	2.06	1.85	1.74	−.11
Ohio	2.58	2.22	3.82	2.65	3.23	2.43	2.03	1.93	1.96	+.03
Oklahoma	3.64	3.83	4.80	4.62	4.11	3.77	3.69	3.30	3.18	−.12
Oregon	2.81	3.40	4.49	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Pennsylvania, bituminous	2.59	2.42	3.77	2.78	3.11	2.75	2.26	2.10	2.13	+.03
South Dakota	2.80	3.17	3.60	2.81	2.84	2.41	2.99	2.91	2.91	.....
Tennessee	2.83	2.77	4.02	3.35	2.89	2.73	2.13	1.85	1.90	+.05
Texas	2.63	2.69	3.75	2.64	2.32	1.82	1.50	1.55	1.60	+.05
Utah	2.71	2.76	3.22	3.35	3.14	2.89	2.69	2.56	2.37	−.19
Virginia	2.51	2.55	3.99	3.06	2.58	2.76	2.04	1.84	1.92	+.08
Washington	3.46	3.58	3.88	4.03	3.98	3.72	3.65	3.62	3.61	−.01
West Virginia	2.56	2.49	4.34	2.84	2.93	2.65	1.82	1.71	1.84	+.13
Wyoming	2.39	2.60	2.98	3.24	3.04	2.76	2.71	2.79	2.74	−.05
Total bituminous	2.58	2.49	3.75	2.89	3.02	2.68	2.20	2.04	2.06	+.02
Pennsylvania anthracite [2]	3.40	4.14	4.85	5.00	5.01	5.43	5.43	5.30	5.62	+.32

[1] California includes Arizona, 1926; Idaho, 1918–1925; Nebraska, 1924; and Oregon, 1921–1926.
[2] These values represent amounts per net ton and include all coal produced.

SPOT PRICES

TABLE 51.—*Average spot price and average amount received per ton for bituminous coal, 1906–1926*

Year	Coal Age's average spot price	Average amount received	Difference	Year	Coal Age's average spot price	Average amount received	Difference
1906	$1.21	$1.11	+$0.10	1918	$2.58	$2.58	
1907	1.18	1.14	+.04	1919	2.59	2.49	+$0.10
1908	1.05	1.12	−.07	1920	5.64	3.75	+1.89
1909	1.04	1.07	−.03	1921	2.55	2.89	−.34
1910	1.23	1.12	+.11	1922	3.64	*3.02	+.62
1911	1.07	1.11	−.04	1923	2.77	2.68	+.09
1912	1.21	1.15	+.06	1924	2.08	2.20	−.12
1913	1.23	1.18	+.05	1925	2.06	2.04	+.02
1914	1.14	1.17	−.03	1926	2.21	2.06	+.15
1915	1.12	1.13	−.01				
1916	1.85	1.32	+.53	Average, 21 yrs.	2.03	1.84	+.19
1917	3.25	2.26	+.99				

TABLE 52.—*Monthly average spot price of bituminous coal f. o. b. mines, 1907–1926, as published by Coal Age*

[Figures are average of trade-journal quotations on 14 coals representative of nearly 90 per cent of the bituminous output of the United States, weighted, first, with respect to the proportions each of slack, prepared, and run of mine normally shipped, and, second, with respect to the tonnage of each normally produced. For 1919 to 1926 the figures are those published currently by Coal Age, based upon the reports of its field correspondents. For 1913 to 1918 they are taken from Prices of Coal and Coke, by C. E. Lesher, published in 1919 as a chapter of Mineral Resources of the United States, 1918, and also separately by the Fuel Administration and the War Industries Board, modified slightly, however, to permit comparison with the postwar quotations. For 1907 to 1912 they are taken from a study by F. G. Tryon and W. F. McKenney, compiled in as nearly the same way as the trade-journal quotations available permit, and representing 12 or 14 coals covered by the later series]

Month	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
January	$1.28	$1.09	$1.06	$1.24	$1.16	$1.14	$1.46	$1.21	$1.13	$1.53
February	1.21	1.07	1.05	1.23	1.11	1.22	1.22	1.16	1.12	1.40
March	1.14	1.05	1.04	1.25	1.08	1.64	1.17	1.17	1.09	1.27
April	1.12	1.05	1.05	1.26	1.06	1.30	1.17	1.16	1.08	1.24
May	1.11	1.03	1.03	1.19	1.05	1.11	1.15	1.16	1.07	1.21
June	1.10	1.03	1.02	1.18	1.05	1.09	1.14	1.12	1.07	1.26
July	1.10	1.02	1.00	1.18	1.03	1.04	1.18	1.12	1.05	1.22
August	1.13	1.04	1.00	1.20	1.02	1.05	1.22	1.13	1.07	1.30
September	1.20	1.06	1.01	1.32	1.03	1.09	1.23	1.11	1.10	1.57
October	1.30	1.05	1.04	1.27	1.04	1.21	1.29	1.13	1.12	2.26
November	1.29	1.05	1.09	1.23	1.09	1.30	1.31	1.10	1.17	3.87
December	1.15	1.04	1.09	1.22	1.09	1.29	1.26	1.11	1.33	4.01
Average	1.18	1.05	1.04	1.23	1.07	1.21	1.23	1.14	1.12	1.85

Month	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
January	$4.15	$2.48	$2.57	$2.57	$3.26	$2.25	$4.38	$2.21	$2.10	$2.18
February	4.18	2.53	2.49	2.58	2.77	2.20	3.59	2.25	2.04	2.09
March	3.89	2.58	2.47	2.58	2.63	2.12	3.20	2.15	1.99	2.01
April	3.21	2.64	2.43	3.85	2.62	2.24	2.84	2.07	1.95	1.92
May	4.14	2.67	2.38	4.59	2.68	3.11	2.68	2.04	1.97	1.93
June	4.00	2.57	2.40	7.18	2.52	3.31	2.56	2.03	1.95	1.90
July	3.17	2.58	2.47	8.24	2.40	4.67	2.40	1.98	1.93	1.91
August	3.24	2.58	2.76	9.51	2.42	6.13	2.39	1.99	2.04	2.00
September	2.02	2.58	2.91	8.52	2.37	5.08	2.46	2.02	2.18	2.15
October	2.02	2.58	3.09	7.78	2.33	4.48	2.28	2.10	2.13	2.70
November	2.48	2.58	2.57	5.87	2.35	4.11	2.25	2.06	2.26	3.19
December	2.48	2.58	2.58	4.38	2.26	4.05	2.18	2.06	2.19	2.53
Average	3.25	2.58	2.59	5.64	2.55	3.64	2.77	2.08	2.06	2.21

CONSUMPTION OF COAL BY USES

Table 53 was prepared to meet many requests for information as to the quantities used by the principal classes of consumers. The year 1923 is shown because it is the latest for which a reasonably detailed analysis can be made. Some items in the total consumption, such as locomotive fuel, foreign bunkers, coal made into coke, and consumption by electric utilities, are reported currently, but for the very large item of consumption by general industries the latest available data are those of the Census of Manufactures of 1923. Fortunately, 1923 was a year of industrial activity in which the relative apportionment of the total among the several uses was close to the average.

With allowance for changes in stocks as well as for exports and imports, the total consumption of anthracite in 1923 was 86,914,000 net tons. Of this, 9.2 per cent was used for mine fuel, 5.3 per cent was purchased by the railroads, 1.3 per cent was consumed by water-gas plants, and 2.6 per cent was used for power generation by the electric public utilities. The "domestic trade," defined as all sales of the domestic sizes not included elsewhere, absorbed 60.2 per cent of the total, leaving 21.4 per cent for the "steam trade," in which term are embraced all sales of the small sizes not included elsewhere. It must be remembered, however, that in recent years large tonnages of buckwheat have made their way into household use.

The consumption of bituminous coal in 1923 was, in round numbers, 519,000,000 tons. (See also Table 3.) Of this the railroads consumed 155,795,000 tons, or 30 per cent. The electric utilities required 7.1 per cent, and the gas utilities (not including, however, coal charged in by-product coke ovens owned by gas companies) another 1 per cent. Beehive and by-product coke ovens together consumed 16.2 per cent. Most of the coke went in turn to the iron and steel industry, which used an additional 5.8 per cent in the form of raw coal. Industrial plants other than steel and coke works accounted for 23 per cent. The consumption for domestic purposes was 12.8 per cent, and the small amount remaining was divided between the coal mines themselves (1.7 per cent), other mines and quarries (0.8 per cent), and ships' bunkers (1.6 per cent).

TABLE 53.—*Consumption of anthracite and bituminous coal in the United States, by principal uses, in 1923, a typical year of active consumption*

	Net tons	Per cent of total
ANTHRACITE		
Power and heat at coal mines [1]	8,018,000	9.2
Railroads	4,578,000	5.3
Artificial gas plants	1,101,000	1.3
Electric utilities, including electric railways	2,273,000	2.6
Domestic trade (domestic sizes not included elsewhere)	52,344,000	60.2
Steam trade (steam sizes not included elsewhere for heating and industrial use)	18,600,000	21.4
	86,914,000	100.0
BITUMINOUS		
Power and heat at coal mines	8,765,000	1.7
Mines and quarries other than coal	4,190,000	.8
Railroads	155,795,000	30.0
Public utilities:		
Electric, including electric railways	36,800,000	7.1
Gas	5,150,000	1.0
Beehive coke plants	30,085,000	5.8
By-product coke plants	54,280,000	10.4
Bunkers:		
Foreign	5,095,000	1.0
Coastwise and Lake trade	2,940,000	.6
Iron and steel works, not including coal for coke [2]	30,220,000	5.8
General industrial and other unspecified uses	119,280,000	23.0
Domestic consumers	66,400,000	12.8
	519,000,000	100.0

[1] Includes 167,000 tons, or 0.2 per cent, of coal used at mines and quarries other than coal mines.
[2] Includes blast furnaces, steel works, and rolling mills.

STOCKS OF COAL HELD BY CONSUMERS

Bituminous coal is seldom stored at the mines. The chief element in the reserves aboveground is the quantity held by consumers, which during the decade covered by the statistical record has fluctuated between a minimum of 20,000,000 and a maximum of 63,000,000 tons. The trend of stocks in 1926 and its influence upon the market have already been pointed out (p. 428). A statistical summary of the stocks of consumers since October 1, 1916, the date of the earliest survey of stocks, is given in Table 54. (See also fig. 3.) Details by localities appear in the quarterly mimeographed reports on stocks, which may be obtained upon application to the Director, Bureau of Mines.

No record is available in tons of the total stocks of anthracite, but the last column of Table 54 shows the number of days' supply in the yards of a representative group of retail dealers.

TABLE 54.—*Stocks of bituminous coal in hands of commercial consumers and stocks of anthracite and bituminous coal in retail dealers' yards, 1916–1926*

[From periodic stock reports of the Bureau of Mines. Coal for steamship fuel, on lake docks, in transit, and in the bins of householders is not included]

Date	Total stock estimated (tons) [1]	Day's supply at current rate of consumption on date of stock taking								
		By-product coke plants	Steel plants	Other industrials	Coal gas plants	Electric utilities	Coal dealers, bituminous	Railroads	Total bituminous	Anthracite in retail yards
1916—Oct. 1	27,000,000	[2]	25		[2]	[2]	[2]	20	[3]	[2]
1917—Oct. 1	28,100,000	[2]	27		[2]	[2]	[2]	18	[4]	[2]
1918—July 15	39,700,000	28	27	48	72	39	15	25	31	[2]
Oct. 1	59,000,000	32	45	71	84	47	28	29	43	[2]
Armistice Day (Nov. 11)	63,000,000	35	45	71	85	49	37	31	45	[2]
1919—Jan. 1	57,900,000	32	42	65	81	49	39	32	42	36
Apr. 1	40,400,000	23	35	47	58	48	25	[4]	31	31
1920—Mar. 1	24,000,000	15	9	27	31	21	13	11	18	21
June 1	20,000,000	8	11	24	22	22	10	10	15	15
1921—Jan. 1	45,800,000	29	42	64	55	44	30	23	39	24
Apr. 1	39,500,000	28	38	47	66	48	26	24	36	36
Aug. 1	41,000,000	31	46	56	79	44	42	32	39	50
Nov. 1	48,500,000	38	46	67	87	54	46	31	43	47
1922—Jan. 1	48,000,000	42	48	51	89	51	33	35	41	44
Mar. 1	52,500,000	39	48	56	82	54	23	42	43	28
Apr. 1	[5] 63,000,000	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Sept. 1	22,000,000	11	12	32	34	26	11	13	17	5
Oct. 1	26,000,000	14	17	33	38	30	18	15	21	7
Nov. 1	32,000,000	18	21	39	55	32	21	13	23	11
1923—Jan. 1	36,000,000	19	27	40	60	33	18	16	26	11
Feb. 1	38,000,000	20	26	36	62	35	15	18	24	8
Mar. 1	36,000,000	19	26	34	58	34	11	16	22	6
June 1	42,000,000	23	29	39	75	45	27	21	30	19
July 1	46,000,000	26	35	46	89	48	39	28	37	25
Aug. 1	52,000,000	27	35	54	104	52	45	39	44	25
Sept. 1	56,000,000	30	33	56	110	52	38	44	46	21
Oct. 1	60,000,000	33	39	56	91	49	36	41	45	22
1924—Jan. 1	62,000,000	35	43	55	91	51	34	44	46	37
June 1	51,000,000	34	56	53	88	63	40	50	49	49
Sept. 1	47,000,000	30	42	48	90	58	46	42	45	58
1925—Jan. 1	[5] 45,000,000	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Mar. 1	44,000,000	25	30	40	78	51	33	35	37	46
June 1	38,000,000	20	27	32	68	48	31	32	32	52
Sept. 1	43,000,000	22	30	30	67	43	27	28	32	53
Nov. 1	48,000,000	26	32	44	78	46	30	30	35	27
1926—Jan. 1	49,000,000	26	28	39	72	48	20	27	30	32
Feb. 1	45,000,000	23	26	37	67	47	17	25	28	18
Apr. 1	40,000,000	21	24	32	60	46	14	23	26	30
May 1	36,000,000	20	25	36	71	54	31	25	31	33
July 1	39,000,000	23	26	35	72	52	43	27	34	40
Aug. 1	41,000,000	24	32	35	61	45	31	30	33	44
Oct. 1	43,000,000	26	37	37	70	45	32	33	35	46
Dec. 31	55,000,000	34	50	41	69	47	23	33	37	54

[1] The figures for 1918 in this table are based upon an actual count. Beginning with Apr. 1, 1919, the figures are based upon reports from a selected list of 5,000 consumers whose stocks in 1918 bore a known relation to the known total stocks.

[2] No data.

[3] Data incomplete. Estimated as 22 days.

[4] Data incomplete. Estimated as 21 days.

[5] No canvass of consumers was made on this date. The total was estimated from stocks reported in the preceding canvass.

DISTRIBUTION

Special reports on the distribution of coal were published in Mineral Resources for 1917 and 1918. These studies, conducted by C. E. Lesher, traced the movement of coal from each major producing field to each consuming State and have been widely used by the coal trade.[34] They were made possible by financial assistance from the

[34] Lesher, C. E., Coal in 1917, part B, "Distribution and consumption": Mineral Resources, 1917, part 2, pp. 1203–1259; Coal in 1918, part B, "Distribution and consumption": Mineral Resources, 1918, part 2, pp. 1317–1373. See also an earlier study in Mineral Resources, 1915, part 2, pp. 433–513.

United States Fuel Administration. Lack of funds has since prevented repeating the analysis of distribution in detail, but a current record of certain major movements, such as the lake, tidewater, and New England trades, has been issued in mimeographed form in the weekly coal report. This record, however, has not been printed, and to meet the general demand for distribution of statistics in permanent form the principal features of the mimeographed series have been condensed in the following summary tables. Certain items on distribution derived from the final annual reports of the coal operators are also included.

MINE FUEL, LOCAL SALES, COAL COKED AT MINES, AND SHIPMENTS

The primary distribution classification is that shown in the basic tables of this report, namely, "used at mines for steam and heat," "sold to local trade," "made into coke at mines," and "loaded at mines for shipment." The proportion disposed of under these several classifications varies greatly from district to district, and it also tends to change with the years. (Table 55.)

TABLE 55.—*Shift in disposal of total output of bituminous coal, 1890–1926*

Year	Per cent of total—				Year	Per cent of total—			
	Loaded at mines for shipment	Made into coke at mines	Sold to local trade	Used at mines for steam and heat		Loaded at mines for shipment	Made into coke at mines	Sold to local trade	Used at mines for steam and heat
1890	78.5	13.8	6.3	1.4	1919	87.8	5.9	3.9	2.4
1895	78.7	13.6	6.2	1.5	1920	88.8	5.4	3.7	2.1
1900	81.5	13.0	3.7	1.8	1921	91.8	2.1	3.9	2.2
1905	80.9	13.5	3.4	2.2	1922	90.9	3.1	4.1	1.9
1910	82.2	12.5	3.0	2.3	1923	89.6	4.9	3.9	1.6
1915	85.8	9.2	2.8	2.2	1924	91.3	3.0	4.3	1.4
1916	84.3	10.4	3.2	2.1	1925	91.8	3.0	4.1	1.1
1917	85.2	9.1	3.5	2.2	1926	91.8	3.1	4.1	1.0
1918	86.8	7.8	3.2	2.2					

Mine fuel.—The proportion used as fuel by the mines themselves has been declining because of the growing practice of buying power to operate the collieries from central electric stations. As late as 1919 about 2.4 per cent of the output of bituminous coal was consumed as colliery fuel. In 1926 this proportion had declined to 1 per cent. Indeed, in certain districts the use of central-station power has become so universal that consumption of fuel is now rarely reported by the mines. In Logan County, W. Va., for example, 22,112,621 tons were mined in 1926, and only 16,755 tons, or less than one-tenth of 1 per cent of the output, were reported as consumed as mine fuel. For the country as a whole the quantity used by the mines is still considerable and amounted in 1926 to 5,727,852 tons.

Local sales.—The proportion of the output sold locally has of late years been increasing slightly and in 1926 amounted to 23,601,587 tons, or 4.1 per cent of the total. This quantity includes coal furnished to company employees, often at nominal prices, coal delivered direct to tenders of steam locomotives at the tipple (a very considerable item in some districts), sales by truck and wagon in near-by towns, and sales to industrial plants, such as brick and tile works,

adjacent to the mines. In the Johnstown district, for example, certain mines dump coal direct into the bins of an affiliated company. The local sales also include deliveries to a few electric power plants built at the mines in regions where adequate supplies of condensing water are also available. The most conspicuous examples are the Springdale station on the Allegheny River, owned by the West Penn Power Co., and the Windsor Station, on the Ohio in the West Virginia Panhandle district, owned jointly by the West Penn and the American Gas & Electric Co. At these mines the transportation arrangements from working face to boiler room are especially interesting. At Springdale the coal is mined in workings on the east side of the Allegheny and hauled in mine cars by electric locomotives through a pair of tunnels under the river to the hoisting shaft on the west side. At the shaft bottom the coal is dumped from the mine cars in a two-car rotary dump operated by electricity and then hoisted to the tipple in tandem skips. At the tipple it is prepared and crushed to the proper size and delivered by belt conveyor to the power station near by. At Windsor similar arrangements prevail; coal is transported by belt conveyor from the tipple of the Beech Bottom mine to the power plant.

Coal coked at the mines.—The most notable change in disposal of the product has been the decline in the proportion made into coke at the mines. In 1890, before the construction of the first by-product ovens, 13.8 per cent of the production of bituminous coal was charged into coke ovens at the mines. As late as 1916 the proportion was 10.4 per cent, but since the war it has fallen rapidly, and in 1926 amounted to only 3.1 per cent. The change reflects the gradual replacement of beehive with by-product coke. With insignificant exceptions, the beehive coke ovens were built at the mines and the coal was moved in a hopper-bottom lorry direct from a bin at the tipple to the ovens. The by-product ovens, on the contrary, were built at the point where the coke was to be used, and even in the Pittsburgh and Birmingham districts, with the rarest exceptions, the coal had to be transported from the mine to the ovens either in railroad cars or river barges.[35] Thus, although the proportion of the total bituminous production made into coke has remained practically constant for a generation, the proportion charged into coke ovens at the mines has steadily decreased. The railroads, although handling smaller tonnages of beehive coke, now handle correspondingly greater amounts of raw coal consigned to distant by-product plants.

Shipments.—The net result of these several shifts in disposal has been to increase the proportion of the total output loaded at the mines for shipment. From 78.5 per cent of the total in 1890 the shipments have risen to 91.8 per cent in 1926.

Anthracite.—Corresponding data for anthracite will be found in Table 16A (p. 575).

[35] At Johnstown, Pa., coal is dumped direct into the bins of an affiliated steel company, but as the quantity used for coke can not readily be separated from that used for other purposes, it is included in the "local sales."

BITUMINOUS COAL LOADED FOR SHIPMENT BY INDIVIDUAL RAILROADS AND WATERWAYS, AS REPORTED BY OPERATORS

The sum of the coal charged into coke ovens at the mines, the local sales, and the mine fuel in 1926 amounted to 47,080,988 tons out of a total production of 573,366,985 tons. The remainder, 526,285,997 tons, was loaded at the mines for shipment, and of this 19,298,259 tons were loaded into barges and other river vessels, and 506,987,738 tons were loaded into railroad cars. Table 56 shows the quantity so originated on each railroad and waterway, as reported by mine operators in answer to the following question:

Railroads or waterways on which product was first loaded for shipment:
Name of road or waterway_____
(Give shipments over each road separately) Tons

_____ _____
_____ _____
_____ _____

The information is complete, all operations of which the Bureau of Mines has record as producing in 1926 being accounted for. As already explained, mine fuel, coal coked at mines, coal loaded direct into locomotive tenders at tipples, and local sales are not included.

As these statistics include nonrevenue railroad fuel, they may differ from those compiled by the railroad companies, which often show only revenue freight and include coal received from connecting lines or coal shipped off the Lake docks, as well as that originating at mines on the lines reporting.

Where the road serving the district is a subsidiary of a larger road some operators may report their coal as loaded on the subsidiary and others as loaded on the parent system. In general, the figures shown here appear under the name reported by the operator, and the bureau does not attempt to combine them by systems, believing that such combinations can best be made by the persons using the figures, who are usually familiar with coal-traffic problems. To approximate the total for the Southern system, for example, the reader should add to the total shown for the Southern Railway the figures for the Alabama Great Southern, Northern Alabama, Cincinnati, New Orleans & Texas Pacific, and Harriman & Northeastern lines. If such a combination is made the total will usually be found to check reasonably with the statistics issued by such railroads as keep records of total coal originated.

A few subsidiaries only have been consolidated under the name of the parent road. The shipments over the Coal & Coke Railroad have been included under the Baltimore & Ohio, and those over the Vandalia, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Pennsylvania Co., the Ohio River & Western, and the Wheeling Terminal have been included under the Pennsylvania system. The Chicago, Terre Haute & Southeastern was leased in 1921 by the Chicago, Milwaukee & St. Paul Railway, and the two are shown combined for 1926 under the name of the latter road.

The figures for the Chicago & Eastern Illinois Railroad include coal loaded in cars of the Elgin, Joliet & Eastern and moved by the latter road over the rails of the Chicago & Eastern Illinois under a trackage agreement.

The Kanawha & Michigan, Kanawha & West Virginia, Toledo & Ohio Central, and Zanesville & Western are shown separately when so reported, rather than in combination with the New York Central, although it is apparent that many operators served by these subsidiaries have reported the name of the parent road.

The quantities shown in the following table as shipped by waterways do not all agree with statistics on river traffic published by the United States Engineer office. In partial explanation, it should be remembered that shipments of coal loaded in cars at the mines and later transferred to boats would be classified by the Bureau of Mines as "rail" and by the Engineer office as "river." Thus, the considerable tonnage moved down the Ohio from Huntington, W. Va., to Cincinnati by the Island Creek Coal Co., although properly appearing in the Engineer office figures of total traffic on the Ohio, is credited by the Bureau of Mines to the Chesapeake & Ohio Railroad, which hauls coal from the company's mines in Logan County to its pier at Huntington.

TABLE 56.—*Bituminous coal loaded for shipment by individual railroads and waterways, as reported by operators, in 1926, in net tons*

Route	State	Quantity	
		By State	Total for route
RAILROADS			
Alabama Central	Alabama	80,077	80,077
Alabama Great Southern	do	43,639	43,639
Alaska	Alaska	82,000	82,000
Appalachian Electric Power Co	West Virginia	20,911	20,911
Arkansas Western	Arkansas	14,141	14,141
Artemus Jellico	Kentucky	159,958	159,958
Atchison, Topeka & Santa Fe	Colorado	671,024	4,163,071
	Illinois	479,207	
	Kansas	827,447	
	Missouri	435,619	
	New Mexico	1,651,503	
	Oklahoma	98,271	
Atlanta, Birmingham & Atlantic	Alabama	23,787	23,787
Baltimore & Ohio	Illinois	1,630,010	41,611,178
	Indiana	247,685	
	Maryland	61,318	
	Ohio	6,218,357	
	Pennsylvania	9,466,958	
	West Virginia	23,986,850	
Bessemer & Lake Erie	Pennsylvania	3,117,362	3,117,362
Big Sandy & Cumberland	Kentucky	13,678	13,678
Big Sandy & Kentucky River	do	182,404	182,404
Birmingham Flat Top	Alabama	362,856	362,856
Birmingham Southern (see also Tennessee Coal, Iron & Railroad Co.).	do	579,850	579,850
Buffalo & Susquehanna	Pennsylvania	507,265	507,265
Buffalo Creek & Gauley	West Virginia	702,000	702,000
Buffalo, Rochester & Pittsburgh	Pennsylvania	6,612,750	6,612,750
Cambria & Indiana	do	2,948,203	2,948,203
Campbell's Creek	West Virginia	739,130	739,130
Carbon County	Utah	330,296	330,296
Caseyville	Illinois	54,607	54,607
Castleman Valley	Maryland	(1)	(1)
Central of Georgia	Alabama	1,237,281	1,289,992
	Georgia	52,711	
Chaffee	Maryland	101,435	101,435
Cheat Haven & Bruceton	West Virginia	355,984	355,984
Chesapeake & Ohio (includes all of Ashland Coal & Iron Co., Long Fork, and Millers Creek).	Kentucky	8,879,473	54,071,362
	West Virginia	45,191,889	
Cheswick & Harmar	Pennsylvania	614,376	614,376
Chicago & Alton	Illinois	2,228,870	2,305,966
	Missouri	66,096	
Chicago & Eastern Illinois	Illinois	4,012,033	7,597,305
	Indiana	3,585,272	

[1] Included under Baltimore & Ohio.

TABLE 56.—*Bituminous coal loaded for shipment by individual railroads and waterways, as reported by operators, in 1926, in net tons*—Continued

Route	State	Quantity	
		By State	Total for route
RAILROADS—continued			
Chicago & Illinois Midland	Illinois	3,087,864	3,087,864
Chicago & North Western	do	3,988,503	4,822,136
	Iowa	764,287	
	Wyoming	69,346	
Chicago, Burlington & Quincy	Colorado	498,969	15,652,300
	Illinois	13,233,713	
	Iowa	318,982	
	Missouri	223,163	
	Wyoming	1,377,473	
Chicago Great Western	Iowa	214,104	214,104
Chicago, Indianapolis & Louisville	Indiana	1,585,485	1,585,485
Chicago, Milwaukee & St. Paul	Illinois	290,071	8,220,935
	Indiana	6,352,743	
	Iowa	407,359	
	Missouri	121,806	
	Montana	933,253	
	North Dakota	105,791	
	South Dakota	3,960	
	Washington	5,952	
Chicago, Peoria & St. Louis	Illinois	782,346	782,346
Chicago, Rock Island & Gulf	Texas	20,392	20,392
Chicago, Rock Island & Pacific	Colorado	12,878	2,141,043
	Illinois	39,014	
	Iowa	1,250,215	
	Missouri	8,997	
	Oklahoma	829,939	
Cincinnati, Indianapolis & Western	Illinois	5,855	132,613
	Indiana	126,758	
Cincinnati, New Orleans & Texas Pacific	Kentucky	67,023	107,781
	Tennessee	40,758	
Cleveland, Cincinnati, Chicago & St. Louis	Illinois	6,473,066	7,020,544
	Indiana	547,478	
Clinchfield	Kentucky	54,700	2,746,015
	Virginia	2,691,315	
Colorado & Southeastern	Colorado	382,469	382,469
Colorado & Southern	do	2,431,824	2,431,824
Colorado & Wyoming	do	322,731	322,731
Conemaugh & Black Lick	Pennsylvania	258,483	258,483
Crystal River & San Juan	Colorado	240	240
Cumberland & Manchester	Kentucky	88,219	88,219
Cumberland & Pennsylvania	Maryland	1,651,397	1,651,397
Dardanelle & Russellville	Arkansas	24,777	24,777
Dents Run	Pennsylvania	53,877	53,877
Denver & Intermountain	Colorado	85,241	85,241
Denver & Rio Grande Western	do	2,928,656	5,150,271
	New Mexico	22,182	
	Utah	2,199,433	
Denver & Salt Lake	Colorado	859,351	859,351
Des Moines & Central Iowa	Iowa	178,392	178,392
Detroit, Toledo & Ironton	Ohio	13,969	13,969
East Broad Top R. R. & Coal Co	Pennsylvania	752,587	752,587
Eastern Kentucky	Kentucky	10,226	10,226
East St. Louis & Suburban	Illinois	96,899	96,899
Elgin, Joliet & Eastern	do	8,338	8,338
El Paso & Southwestern	New Mexico	867,186	867,186
Erbacon & Summerville	West Virginia	19,649	19,649
Erie	Ohio	117,761	1,017,292
	Pennsylvania	899,531	
Evansville & Ohio Valley	Indiana	84,502	84,502
Evansville, Indianapolis & Terre Haute	do	3,406,435	3,406,435
Evansville, Suburban & Newburgh	do	106,470	106,470
Federal Valley	Ohio	2,898	2,898
Fort Smith & Western	Oklahoma	112,986	112,986
Fort Smith, Subiaco & Rock Island	Arkansas	15,066	15,066
Galveston, Harrisburg & San Antonio	Texas	32,300	32,300
Great Northern	Montana	275,929	837,598
	North Dakota	340,241	
	Washington	221,428	
Greenbrier & Eastern	West Virginia	1,370,506	1,370,506
Greenbrier, Cheat & Elk	do	22,188	22,188
Harriman & Northeastern	Tennessee	295,812	295,812
Hartland	West Virginia	109,649	109,649
Hocking Valley	Ohio	1,605,516	1,605,516
Houston & Texas Central	Texas	47,900	47,900
Houston, East & West Texas	do	57,000	57,000

TABLE 56.—*Bituminous coal loaded for shipment by individual railroads and waterways, as reported by operators, in 1926, in net tons*—Continued

Route	State	Quantity	
		By State	Total for route
RAILROADS—continued			
Huntingdon & Broad Top Mountain	Pennsylvania	738,488	738,488
Illinois Central	Alabama	200,040	21,699,636
	Illinois	11,851,266	
	Indiana	409,162	
	Kentucky	9,239,168	
Illinois Central Electric	Illinois	4,818	4,818
Illinois Terminal	do	19,026	19,026
Illinois Traction	do	423,474	423,474
Indian Creek Valley	Pennsylvania	486,492	486,492
International Great Northern	Texas	120,620	120,620
Interstate	Kentucky	21,105	3,090,265
	Virginia	3,069,160	
Iowa Southern Utilities Co	Iowa	113,180	113,180
Jefferson Southwestern	Illinois	69,025	69,025
Johnstown & Stony Creek	Pennsylvania	185,414	185,414
Joplin & Pittsburg	Kansas	113,429	113,429
Kanawha & Michigan (see also New York Central)	Ohio	57,247	158,415
	West Virginia	101,168	
Kanawha & West Virginia (see also New York Central)	do	58,000	58,000
Kanawha Central	do	169,807	169,807
Kanawha, Glen Jean & Eastern	do	1,009,376	1,009,376
Kansas City, Clay County & St. Joseph	Missouri	6,461	6,461
Kansas City Southern	Kansas	513,780	950,354
	Missouri	380,365	
	Oklahoma	56,209	
Kansas, Oklahoma & Gulf	do	114,444	114,444
Kellys Creek	West Virginia	1,008,329	1,008,329
Kentucky & Tennessee	Kentucky	883,202	883,202
Lake Erie, Franklin & Clarion	Pennsylvania	385,914	385,914
Laramie, North Park & Western	Colorado	51,697	51,697
Lenox	Kentucky	2,652	2,652
Ligonier Valley	Pennsylvania	430,827	430,827
Litchfield & Madison	Illinois	929,467	929,467
Louisiana Railway & Navigation Co. of Texas	Texas	29,494	29,494
Louisville & Nashville	Alabama	4,842,571	39,689,404
	Illinois	274,088	
	Kentucky	33,220,360	
	Tennessee	1,095,242	
	Virginia	257,143	
Louisville, Henderson & St. Louis	Kentucky	86,098	86,098
Marion & Eastern	Illinois	652,979	652,979
Michigan Central	Michigan	285,753	285,753
Midland Valley	Arkansas	182,208	515,910
	Oklahoma	333,702	
Minneapolis & St. Louis	Illinois	374,308	674,905
	Iowa	300,597	
Minneapolis, St. Paul & Sault Ste. Marie	North Dakota	151,753	151,753
Missouri-Illinois	Illinois	484,954	484,954
Missouri, Kansas & Texas	Kansas	97,529	809,875
	Missouri	48,820	
	Oklahoma	516,646	
	Texas	146,880	
Missouri Pacific	Arkansas	961,170	7,847,364
	Illinois	5,069,087	
	Kansas	1,015,112	
	Missouri	801,995	
Mobile & Ohio	Alabama	577,173	1,055,918
	Illinois	478,745	
Monongahela	Pennsylvania	5,587,153	12,858,989
	West Virginia	7,271,836	
Montana	Arkansas	70,200	70,200
Montana, Wyoming & Southern	Montana	316,979	316,979
Montour	Pennsylvania	2,869,855	2,869,855
Nashville, Chattanooga & St. Louis	Alabama	310	1,004,553
	Tennessee	1,004,243	
National Coal Railway Co	Utah	79,298	79,298
New Mexico Lumber Co	Colorado	5,160	5,160
New Mexico Midland	New Mexico	67,618	67,618
New York Central (includes some coal shipped over subsidiary roads: Kanawha & Michigan, Kanawha & West Virginia, Toledo & Ohio Central, and Zanesville & Western).	Ohio	5,169,577	13,791,561
	Pennsylvania	6,298,942	
	West Virginia	2,323,042	
New York, Chicago & St. Louis	Indiana	2,168	2,168
Norfolk & Western	Kentucky	5,515,153	43,608,380
	Virginia	3,894,579	
	West Virginia	34,198,648	

TABLE 56.—*Bituminous coal loaded for shipment by individual railroads and waterways, as reported by operators, in 1926, in net tons*—Continued

Route	State	Quantity	
		By State	Total for route
RAILROADS—continued			
Norfolk Southern	North Carolina	51,997	51,997
Northern Alabama	Alabama	471,028	471,028
Northern Ohio Traction & Light Co	Ohio	19,661	19,661
Northern Pacific	Montana	1,112,778	3,153,823
	North Dakota	468,338	
	Washington	1,572,707	
Norton & Northern	Virginia	101,030	101,030
Ohio & Kentucky	Kentucky	13,554	13,554
Ohio River Electric	Ohio	9,650	9,650
Oklahoma City-Ada-Atoka	Oklahoma	57,873	57,873
Oneida & Western	Tennessee	2,645	2,645
Oregon Short Line	Idaho	2,500	1,212,487
	Wyoming	1,209,987	
Oregon-Washington Railroad & Navigation Co	Washington	247,338	247,338
Pacific Coast	do	341,090	341,090
Pennsylvania (includes Ohio River & Western and Pittsburgh, Cincinnati, Chicago & St. Louis).	Illinois	1,081,773	[2] 65,929,084
	Indiana	4,282,523	
	Ohio	5,168,021	
	Pennsylvania	53,951,342	
	West Virginia	1,445,425	
Peoria & Pekin Union	Illinois	113,902	113,902
Peoria, Hanna City & Western	do	695,080	695,080
Pere Marquette	Michigan	344,307	344,307
Peru, La Salle & Deer Park	Illinois	70,740	70,740
Pittsburgh & Lake Erie	Pennsylvania	3,346,628	3,346,628
Pittsburg & Shawmut	do	2,280,859	2,280,859
Pittsburgh & Susquehanna	do	233,437	233,437
Pittsburgh & West Virginia (includes West Side Belt)	Ohio	374,409	5,286,989
	Pennsylvania	4,661,215	
	West Virginia	251,365	
Pittsburgh, Chartiers & Youghiogheny	Pennsylvania	70,880	70,880
Pittsburgh, Harmony, Butler & New Castle	do	29,943	29,943
Pittsburgh, Lisbon & Western	do	202,393	202,393
Pittsburg, Shawmut & Northern	do	468,591	468,591
Preston	Maryland	284	235,668
	West Virginia	235,384	
Puget Sound Electric	Washington	22,208	22,208
Quincy, Omaha & Kansas City	Missouri	16,534	16,534
Rio Grande & Eagle Pass	Texas	27,394	27,394
Rio Grande Eastern	New Mexico	14,003	14,003
Rio Grande Southern	Colorado	51,127	51,127
Rock Castle River	Kentucky	6,500	6,500
Rockdale, Sandow & Southern	Texas	194,425	194,425
Rock Island Southern	Illinois	76,012	76,012
Rural Valley	Pennsylvania	7,500	7,500
St. Louis & Belleville Electric	Illinois	28,977	28,977
St. Louis & Hannibal	Missouri	16,679	16,679
St. Louis & O'Fallon	Illinois	748,061	748,061
St. Louis & Ohio River	do	213,699	213,699
St. Louis-San Francisco	Alabama	2,662,510	5,232,723
	Arkansas	160,236	
	Kansas	1,427,579	
	Missouri	416,681	
	Oklahoma	565,717	
St. Louis Southwestern of Texas	Texas	265,240	265,240
St. Louis, Troy & Eastern	Illinois	591,542	591,542
Sandy Valley & Elkhorn	Kentucky	1,932,018	1,932,018
Scott's Run	West Virginia	2,254,117	2,254,117
Sewell Valley	do	183,632	183,632
Sloss-Sheffield Steel & Iron Co	Alabama	613,466	613,466
Southern	do	4,126,208	11,822,655
	Illinois	701,920	
	Indiana	1,283,587	
	Kentucky	539,725	
	Tennessee	1,836,479	
	Virginia	3,334,736	
Southern Illinois Railway & Power Co	Illinois	25,427	25,427
Southern Pacific	California	10	4,268
	Oregon	4,258	

[2] Attention is called to the fact that in the corresponding table for 1925 ("Coal in 1925," p. 475) the Pennsylvania Railroad is erroneously credited with 378 tons from Maryland. Officials state that although the railroad has a line to Cumberland, Md., no coal has been originated on its rails in that State, and the bureau has since been advised by the operator in question that the 378 tons should be credited instead to the Cumberland & Pennsylvania Railroad.

TABLE 56.—*Bituminous coal loaded for shipment by individual railroads and waterways, as reported by operators, in 1926, in net tons*—Continued

Route	State	Quantity	
		By State	Total for route
RAILROADS—continued			
Strouds Creek & Muddlety	West Virginia	29,460	29,460
Susquehanna & New York	Pennsylvania	42,600	42,600
Tennessee	Tennessee	366,073	366,073
Tennessee Central	do	734,178	734,178
Tennessee Coal, Iron & R. R. Co. (see also Birmingham Southern)	Alabama	2,638,256	2,638,256
Texas & Pacific	Texas	96,000	96,000
Texas Short Line	do	23,200	23,200
Thomas & Sayreton	Alabama	434,616	434,616
Toledo & Ohio Central (see also New York Central)	Ohio	921,999	921,999
Toledo, Peoria & Western	Illinois	155,407	155,407
Toronto, Knoxville & Western	Ohio	108,923	108,923
Uintah	Colorado	9,612	9,612
Union	Pennsylvania	72,597	72,597
Union Pacific	Colorado	1,312,701	4,925,679
	Kansas	20,000	
	Utah	47,495	
	Wyoming	3,545,483	
Unity	Pennsylvania	898,271	898,271
Ursina & North Fork	do	1,600	1,600
Utah	Utah	1,422,825	1,422,825
Virginian	Virginia	33,548	10,684,425
	West Virginia	10,650,877	
Wabash	Illinois	3,035,066	3,356,318
	Iowa	244,777	
	Missouri	76,475	
Wabash, Chester & Western	Illinois	20,413	20,413
Washington Run	Pennsylvania	566,011	566,011
Western Allegheny	do	377,715	377,715
Western Maryland	Maryland	1,141,155	5,341,923
	Pennsylvania	757,578	
	West Virginia	3,443,190	
West Side Belt	Pennsylvania	[3]	[3]
West Virginia Northern	West Virginia	457,269	457,269
Wheeling & Lake Erie	Ohio	4,124,257	4,124,257
Winifrede	West Virginia	111,030	111,030
Woodward Iron Co	Alabama	1,046,003	1,046,003
Youngstown & Ohio River	Ohio	138,686	138,686
Zanesville & Western (see also New York Central)	do	762,143	762,143
Total railroad shipments		506,987,738	506,987,738
WATERWAYS			
Allegheny River	Pennsylvania	744,628	744,628
Black Warrior River	Alabama	68,967	68,967
Green River	Kentucky	69,256	69,256
Illinois River	Illinois	926	926
Kanawha River	West Virginia	545,890	545,890
Monongahela River	Pennsylvania	17,409,774	17,409,774
Muskingum River	Ohio	58,000	58,000
Ohio River	Kentucky	306,029	400,111
	Pennsylvania	743	
	West Virginia	93,339	
Tradewater River	Kentucky	707	707
Total waterway shipments		19,298,259	19,298,259
Grand total, loaded at mines for shipment by railroads and waterways		526,285,997	526,285,997
Sold to local trade and used by employees		23,601,587	23,601,587
Used at mines for steam and heat		5,727,852	5,727,852
Made into coke at mines		17,751,549	17,751,549
Total production		573,366,985	573,366,985

[3] Included under Pittsburgh & West Virginia.

LAKE SHIPMENTS OF BITUMINOUS COAL

The Lake cargo movement of 1926 was one of the largest in the history of the Lake trade. The total quantity loaded into vessels at the Lake Erie piers, according to the Ore & Coal Exchange, was 29,743,854 tons, of which 1,584,778 tons was vessel fuel and 28,159,076

tons cargo coal. The cargo dumpings exceeded by a few hundred tons those of 1918 [36] and were not far below the record of 29,828,784 tons established in 1923. Shipments were heaviest in June, when 4,586,282 tons of cargo coal and 228,700 tons of vessel fuel were dumped, a total of 4,814,982 tons. (Table 57.)

TABLE 57.—*Bituminous coal loaded into vessels at Lake Erie ports, 1919–1926, in net tons* [1]

	Cargo coal	Vessel fuel	Total
1919	21,713,341	1,037,051	22,750,392
1920	22,408,355	1,258,783	23,667,138
1921	22,412,380	759,069	23,171,449
1922	18,522,142	829,181	19,351,323
1923	29,828,784	1,628,510	31,457,294
1924	22,974,991	1,347,561	24,322,552
1925	26,330,843	1,532,153	27,862,996
1926:			
January		1,421	1,421
February			
March	111,577	5,413	116,990
April	904,287	46,174	950,461
May	3,916,350	174,183	4,090,533
June	4,586,282	228,700	4,814,982
July	4,394,753	247,494	4,642,247
August	3,843,264	249,794	4,093,058
September	3,310,697	229,429	3,540,126
October	3,328,079	218,613	3,546,692
November	3,276,516	164,130	3,440,646
December [2]	487,271	19,427	506,698
	28,159,076	1,584,778	29,743,854

[1] From records of the Ore and Coal Exchange.
[2] Figures include 10,872 tons of cargo coal and 2,124 tons of vessel fuel loaded into vessels for winter storage at Lake Erie ports.

Table 58 gives the destination of the cargo shipments of the last three years. It is worthy of note that all of the large increase in 1926 as compared to 1924 represents shipments to American ports. The shipments to Canada were somewhat less than in 1924, but those to Lake Michigan increased by 2,534,405 tons and those to American ports on Lake Superior by 1,675,375 tons.

TABLE 58.—*Destination of bituminous cargo coal dumped into vessels at Lake Erie ports in the seasons of 1924, 1925, and 1926* [a]

Destination	1924		1925		1926	
	Net tons	Per cent	Net tons	Per cent	Net tons	Per cent
American:						
Lake Superior ports	9,539,277	41.3	10,841,678	41.2	11,214,652	39.9
Sault Ste. Marie and river points	469,028	2.0	618,014	2.4	642,823	2.3
Lake Huron ports	310,860	1.3	341,829	1.3	425,675	1.5
Lake Michigan ports	6,550,758	28.3	8,203,007	31.2	9,085,163	32.3
Port Huron and Detroit River	618,759	2.7	1,135,954	4.3	1,144,282	4.1
Lake Erie ports	734,700	3.2	922,980	3.5	706,199	2.5
Lake Ontario and St. Lawrence River			61,976	.2	13,267	.1
Total American	18,223,382	78.8	22,125,438	84.1	23,232,061	82.7
Canadian:						
Lake Superior ports	2,014,304	8.7	806,856	3.1	1,105,632	3.9
Sault Ste. Marie and river points	788,742	3.4	591,432	2.2	918,260	3.3
Lake Huron-Georgian Bay ports	645,106	2.8	683,151	2.6	903,368	3.2
Port Huron and Detroit River	548,074	2.4	653,404	2.5	701,420	2.5
Lake Erie ports	397,729	1.7	568,717	2.2	638,233	2.3
Lake Ontario and St. Lawrence River	506,697	2.2	874,720	3.3	593,784	2.1
Total Canadian	4,900,652	21.2	4,178,280	15.9	4,860,697	17.3
Grand total	23,124,034	100.0	26,303,718	100.0	28,092,758	100.0

[a] From records of the Ore and Coal Exchange. As these figures represent movement of vessels away from the ports they do not agree exactly with the total loaded into vessels because at the end of the season some coal is dumped into vessels for storage during the winter and shipment up the Lakes the following year.

[36] Statistics of the Lake cargo movement from 1910 to 1918 are given in Coal in 1918, pt. B, pp. 1324–1329.

The origin by districts of the cargo coal shipped in 1926 is shown in Table 59 from data furnished by the Ohio Bureau of Coal Statistics. As this table is based on railroad records of the coal as billed from the mines, the total differs slightly from the total of dumpings at the ports given in Table 57. Corresponding figures for each year from 1910 to 1918 are given in Coal in 1918, part B, page 1329.

TABLE 59.—*Shipments of bituminous coal to Great Lakes ports for loading into vessels as cargo, by districts of origin, in the seasons of 1919–1926, in net tons*[1]

District	1919	1920	1921	1922
Eastern Kentucky	1,425,466	1,375,323	2,624,194	3,091,089
Ohio:				
Cambridge	802,150	778,776	981,997	615,736
Hocking	1,072,424	2,575,086	668,577	1,288,269
Northern Ohio	155,646	453,829	208,994	194,608
No. 8	3,809,584	3,799,023	3,678,554	1,287,123
Pennsylvania:				
Altoona and Meyersdale	10,227	22,410	30,182	81,420
Connellsville	(2)	(2)	(2)	374,936
Northern Pennsylvania	557,557	1,044,579	723,819	832,339
Pittsburgh	[2] 6,512,051	[2] 6,203,444	[2] 5,907,489	4,002,214
West Virginia:				
Cumberland-Piedmont	8,642	21,459	4,352	676
Fairmont	[3] 828,383	[3] 1,284,041	[3] 1,014,514	[3] 1,369,969
Kanawha	3,393,849	3,020,946	3,687,136	2,671,251
Moundsville	(3)	(3)	(3)	(3)
New River	537,436	233,633	208,890	271,630
Pocahontas	2,313,728	1,434,183	2,430,559	1,665,556
Thacker-Kenova	314,026	143,645	190,911	761,962
Tennessee	13,109	185	3,731	25,667
Virginia	1,591	92		43,208
	21,755,869	22,390,654	22,363,899	18,577,[illegible]

District	1923	1924	1925	1926
Eastern Kentucky	3,297,476	3,514,355	6,606,932	6,933,527
Ohio:				
Cambridge	954,867	1,005,498	4,381	68,181
Hocking	919,927	90,165	115,496	173,953
Northern Ohio	361,567	57,327	15,704	29,724
No. 8	3,716,307	2,851,212	1,316,428	1,149,102
Pennsylvania:				
Altoona and Meyersdale	31,316	1,605	1,398	1,875
Connellsville	468,859	548,327	367,418	598,494
Northern Pennsylvania	1,081,927	482,484	5,096	825,487
Pittsburgh	7,977,903	3,249,209	2,106,587	2,506,685
West Virginia:				
Cumberland-Piedmont	796	5,146	4,023	3,030
Fairmont	[3] 3,169,505	[3] 1,404,159	1,623,499	2,141,924
Kanawha	4,581,656	5,754,567	7,803,062	7,548,932
Moundsville	(3)	(3)	760,614	326,877
New River	448,566	353,049	396,090	431,391
Pocahontas	2,445,507	2,630,625	3,295,537	3,484,807
Thacker-Kenova	383,016	977,870	1,794,479	1,595,398
Winding Gulf				280,452
Tennessee		55,248	17,502	82,629
Virginia	723	202	98,877	59,921
	29,839,918	22,981,048	26,333,184	28,[illegible]

[1] From records of Ohio Bureau of Coal Statistics.
[2] Figures for Connellsville included with Pittsburgh before 1922.
[3] Figures for Moundsville included with Fairmont before 1925.

LAKE SHIPMENTS OF ANTHRACITE

The movement of anthracite up the Great Lakes is handled through the ports of Buffalo and Erie. From 1918 to 1921 the total shipments averaged over 4,000,000 net tons a year; in 1924 they declined to 3,094,088 tons. The late suspension further reduced the shipments, so that in 1925 they amounted to only 1,793,516

tons and in 1926 to 2,857,917. (Table 60.) Even after the resumption of mining the rate of movement, as shown by the monthly returns for July to November, did not reach the level of the corresponding periods in 1919, 1920, and 1921.

The Ore and Coal Exchange of Cleveland has recently undertaken to prepare regular weekly and monthly statements of the tonnage of anthracite forwarded and has worked out a careful monthly record back to January, 1918. As data in comparable form have not been available for previous coal reports, they are published in detail in Table 60.

TABLE 60.—*Anthracite cargo coal loaded into vessels at Lake Erie ports, by months, 1918–1926, in net tons* [1]

	March	April	May	June	July	August
Buffalo:						
1918		63,757	375,887	437,533	443,216	519,612
1919	128,425	291,566	350,812	466,689	616,716	496,877
1920		72,519	388,936	569,829	516,977	580,157
1921	110,440	349,292	461,254	472,563	617,877	703,262
1922		[2] 18,871	(2)	(2)	(2)	(2)
1923		139,615	442,895	491,118	569,495	433,554
1924	48,101	185,598	227,446	409,620	538,793	567,662
1925	171,840	317,486	268,024	359,426	230,273	168,498
1926			275,197	469,408	454,439	419,364
Erie:						
1918			52,792	37,922	60,504	46,393
1919	21,447		35,526	32,327	58,268	90,691
1920		27,134	44,447	44,950	62,885	74,095
1921	20,327	19,273	24,492	54,155	77,852	76,752
1922		(2)	(2)	(2)	[2] 6,000	(2)
1923			30,558	60,860	69,108	58,977
1924	10,067	21,085	15,595	57,441	54,273	88,107
1925	9,480	27,709	78,625	27,888	47,649	31,084
1926			66,451	80,633	108,549	80,593
Both ports:						
1918		63,757	428,679	475,455	503,720	566,005
1919	149,872	291,566	386,338	499,016	674,984	587,568
1920		99,653	433,383	614,779	579,862	654,252
1921	130,767	368,565	485,746	526,718	695,729	780,014
1922		[2] 18,871	(2)	(2)	[2] 6,000	(2)
1923		139,615	473,453	551,978	638,603	492,531
1924	58,168	206,683	243,041	467,061	593,066	655,769
1925	181,320	345,195	346,649	387,314	277,922	200,482
1926			341,648	550,041	562,988	499,957

	September	October	November	December	Season
Buffalo:					
1918	501,446	542,847	607,022	129,544	3,620,864
1919	484,980	645,483	561,101	37,685	4,080,334
1920	[2] 300,432	569,036	537,231	67,234	3,602,351
1921	416,418	403,342	277,970	31,843	3,844,261
1922	[2] 45,144	466,152	536,723	115,436	1,182,326
1923	[2] 91,908	453,923	417,175	51,723	3,091,406
1924	253,205	232,057	214,169	33,203	2,709,854
1925	[2] 34,311	(2)	(2)	(2)	1,549,858
1926	176,930	263,425	267,665	21,398	2,347,826
Erie:					
1918	40,320	71,474	51,356		360,761
1919	57,408	87,305	72,382		455,354
1920	[2] 56,720	61,532	58,875		430,638
1921	55,317	64,239	29,046		421,453
1922	[2] 17,836	79,747	81,423	14,614	199,620
1923	[2] 20,889	86,861	93,420		420,673
1924	44,742	45,417	46,267	1,240	384,234
1925	[2] 20,323	(2)	(2)	(2)	243,658
1926	45,121	73,493	55,251		510,091
Both ports:					
1918	541,766	614,321	658,378	129,544	3,981,625
1919	542,388	732,788	633,483	37,685	4,535,688
1920	[2] 357,152	630,568	596,106	67,234	4,032,989
1921	471,735	467,581	307,016	31,843	4,265,714
1922	[2] 62,980	545,899	618,146	130,050	1,381,946
1923	[2] 112,797	540,784	510,595	51,723	3,512,079
1924	297,947	277,474	260,436	34,443	3,094,088
1925	[2] 54,634	(2)	(2)	(2)	1,793,516
1926	222,051	336,918	322,916	21,398	2,857,917

[1] From records of Ore and Coal Exchange.

[2] Strike in anthracite region.

RECEIPTS AT THE HEAD OF LAKE SUPERIOR

The quantity of anthracite received at Duluth-Superior harbor in the season of 1926 was 1,272,973 net tons, about the same as in 1924. Receipts of bituminous coal amounted to 9,168,656 tons and showed a large increase over 1924. The following table is compiled from the records of the United States Engineer office at Duluth:

TABLE 61.—*Receipts of coal at Duluth-Superior harbor, 1919–1926, in net tons*

	Anthracite	Bituminous coal	Total
1919	1,795,257	7,079,840	8,875,097
1920	1,637,477	7,393,219	9,030,696
1921	1,844,642	8,320,207	10,164,849
1922	566,362	5,138,934	5,705,296
1923	1,419,984	11,268,337	12,688,321
1924	1,289,994	7,730,878	9,020,872
1925	790,132	8,882,569	9,672,701
1926:			
May	115,538	1,691,569	1,807,107
June	245,707	1,800,998	2,046,705
July	269,220	1,636,714	1,905,934
August	269,664	1,279,290	1,548,954
September	95,574	844,893	940,467
October	105,759	901,003	1,006,762
November	124,812	764,057	888,869
December	46,699	250,132	296,831
	1,272,973	9,168,656	10,441,629

[1] From records of United States Engineer office, Duluth, Minn.

TIDEWATER BITUMINOUS COAL SHIPMENTS

All records of the tonnage of bituminous coal handled at tidewater piers were broken in 1926. The total dumped at the five ports of New York, Philadelphia, Baltimore, Hampton Roads, and Charleston (S. C.) was 57,574,498 net tons. A small business is done at piers at other ports in New England and on the South Atlantic, Gulf, and Pacific coasts; but, as shown by a detailed study made in 1918, the quantity handled at these other ports amounted to only 4.1 per cent of the total. For practical purposes, therefore, dumpings at the five Atlantic ports mentioned may be taken as the tidewater coal trade of the United States.

In comparison with 1925 the dumpings of 1926 show an increase of 20,000,000 tons, and in comparison with 1920, hitherto the record year, an increase of nearly 3,800,000 tons. Table 62 summarizes the tidewater movement by ports and destinations.

The chief element in the increase of 1926 was the heavy export demand stimulated by the British strike. In 1925 the exports through the five ports amounted to 5,109,491 net tons; in 1926 they jumped to 21,900,304 tons. As these figures are based on records kept by the railroads operating the piers, they differ slightly from the official statistics of exports as kept by the customs service, which represent vessel clearances from the port. The differences, however, are slight, and the export figures reported by the railroads are used here because they are comparable with the dumpings for other destinations given in the table. Indeed, the exports of 1926 slightly

exceeded those of 1920, a year when the export demand was so intense that spot prices in the New River and Pocahontas fields rose as high as $12.90 a ton f. o. b. mines. It is therefore interesting to compare the records of 1926 with those of 1920 in other channels of the tidewater distribution. Dumpings of bunker coal, although much larger than in 1925, were slightly less than in 1920, reflecting competition of fuel oil. Shipments to New England increased heavily over 1920, as did those designated as "inside capes" and "other tonnage."

Striking changes were also recorded between 1920 and 1926 in the quantities handled by the several ports. While the dumpings in New York and Philadelphia decreased, those at Baltimore and Hampton Roads showed a large increase. At Baltimore the tonnage rose from 7,830,813 in 1920 to 10,352,835 in 1926. Hampton Roads, which had attained 24,025,787 tons in 1920—at that time considered a remarkable performance—now reached a total of 30,716,282 tons.

TABLE 62.—*Total tidewater shipments of bituminous coal, by years, 1919–1926, in net tons*

	1919	1920	1921	1922	1923	1924	1925	1926
By destinations:								
Coastwise to New England	8,385,382	10,456,444	8,858,631	10,892,460	13,374,320	11,488,230	13,463,462	12,948,939
Exports	8,292,413	21,778,206	9,632,688	1,613,390	5,121,654	4,767,887	5,109,491	21,900,304
Bunker	6,873,919	9,171,070	8,135,342	4,576,039	5,442,123	4,961,330	5,487,857	8,544,538
Inside capes	3,437,855	3,410,301	3,251,114	3,331,706	4,459,659	3,752,868	4,347,956	4,373,071
Other tonnage	10,072,250	8,968,161	7,445,338	8,058,915	9,122,751	8,246,438	8,714,972	9,807,646
	37,061,819	53,784,182	37,323,113	28,472,510	37,520,507	33,216,753	37,123,738	57,574,498
By ports:								
New York	14,234,236	14,824,912	11,911,974	7,439,431	10,799,410	9,004,960	9,230,448	10,336,698
Philadelphia	4,410,909	6,191,667	3,640,987	2,157,224	3,892,868	2,876,760	3,107,925	5,446,962
Baltimore	3,467,273	7,830,813	4,136,368	1,916,763	5,067,979	3,062,834	3,430,054	10,352,835
Hampton Roads	14,629,130	24,025,787	17,241,422	16,627,009	17,384,484	18,094,077	21,113,240	30,716,282
Charleston	320,271	911,003	392,362	332,083	375,766	178,122	242,071	721,721
	37,061,819	53,784,182	37,323,113	28,472,510	37,520,507	33,216,753	37,123,738	57,574,498

Table 63 continues the analysis by showing the distribution of the tonnage handled at each port. It indicates that Hampton Roads is the dominant source of the coastwise movement to New England, and that Hampton Roads and Baltimore are now the chief centers of the sea-borne export trade. New York remains an important supplier of bunker coal. The item of "inside capes" for the port of Philadelphia refers to coal dumped into barges and moved to points inside the capes of the Delaware. Similarly, the items "inside capes" at Baltimore and Hampton Roads refer to coal moved by barge or other vessel to points within the capes at the entrance of Chesapeake Bay. The large item "other tonnage" at New York probably includes some coal later delivered for ships' bunkers at other points in New York Harbor but consists principally of coal consigned to the many large plants equipped to receive coal by water in and around New York and northern New Jersey. At Hampton Roads the item of "other tonnage" includes coal for the Navy and coastwise shipments to points outside New England—among others, to Panama.

TABLE 63.—*Summary of tidewater shipments of bituminous coal, by ports and destinations, in 1926, in net tons*

Destination	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
Coastwise to New England	972, 945	492, 667	977, 472	10, 505, 855	.....	12, 948, 939
Exports	30, 200	2, 254, 151	6, 478, 076	12, 552, 061	585, 816	21, 900, 304
Bunker	2, 879, 584	728, 809	967, 273	3, 835, 915	132, 957	8, 544, 538
Inside capes	.....	1, 958, 398	1, 896, 744	517, 929	.....	4, 373, 071
Other tonnage	6, 453, 969	12, 937	33, 270	3, 304, 522	2, 948	9, 807, 646
	10, 336, 698	5, 446, 962	10, 352, 835	30, 716, 282	721, 721	57, 574, 498

Tables 64 and 65 give details of the tidewater dumpings for each month of 1926. It will be seen that during November, when exports reached their maximum, the piers handled 6,997,860 net tons in 30 days, or at the rate of 85,000,000 net tons a year. The exports in November were 3,663,867 tons, or at the rate of 44,000,000 tons a year. This figure is a practical demonstration of the large volume of exports which the piers can now handle and at the same time care for other necessary business.

The maximum dumped in any one month at Hampton Roads was 3,402,756 tons, attained in October, which is at the rate of 40,000,000 tons a year.

TABLE 64.—*Monthly tidewater shipments of bituminous coal in 1926, by destinations, in net tons*

Month	New England	Exports	Bunker	Inside capes	Other tonnage	Total
January	1, 133, 440	289, 614	533, 132	350, 095	1, 143, 671	3, 449, 952
February	1, 031, 981	366, 129	423, 390	386, 679	1, 335, 524	3, 543, 703
March	1, 370, 653	510, 280	566, 955	451, 792	920, 201	3, 819, 881
April	1, 019, 682	468, 820	526, 761	344, 240	713, 063	3, 072, 566
May	1, 033, 529	678, 816	550, 525	295, 873	656, 174	3, 214, 917
June	925, 252	1, 218, 921	640, 260	336, 021	663, 814	3, 784, 268
July	877, 107	2, 473, 997	731, 213	335, 518	812, 310	5, 030, 145
August	928, 122	2, 826, 639	858, 852	318, 726	644, 977	5, 577, 316
September	1, 027, 383	2, 769, 253	862, 785	357, 838	657, 674	5, 674, 933
October	1, 165, 320	3, 477, 506	951, 479	382, 435	742, 552	6, 719, 292
November	1, 140, 895	3, 663, 867	983, 846	353, 572	855, 680	6, 997, 860
December	1, 295, 575	3, 156, 462	915, 340	460, 282	862, 006	6, 689, 665
	12, 948, 939	21, 900, 304	8, 544, 538	4, 373, 071	9, 807, 646	57, 574, 498

TABLE 65.—*Monthly tidewater shipments of bituminous coal in 1926, by ports, in net tons*

Month	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
January	1, 168, 411	257, 569	253, 127	1, 750, 618	20, 227	3, 449, 952
February	1, 314, 676	214, 861	263, 256	1, 728, 404	22, 506	3, 543, 703
March	908, 209	276, 205	414, 681	2, 128, 175	32, 611	3, 819, 881
April	722, 001	227, 267	282, 190	1, 821, 076	20, 032	3, 072, 566
May	661, 497	231, 273	344, 251	1, 962, 461	15, 435	3, 214, 917
June	758, 837	216, 610	524, 381	2, 250, 204	34, 236	3, 784, 268
July	692, 980	286, 519	914, 955	3, 062, 285	73, 406	5, 030, 145
August	675, 329	506, 855	1, 190, 018	3, 090, 848	114, 266	5, 577, 316
September	706, 093	553, 802	1, 240, 193	3, 058, 218	116, 627	5, 674, 933
October	779, 081	864, 613	1, 622, 593	3, 402, 756	50, 249	6, 719, 292
November	958, 297	998, 834	1, 730, 603	3, 207, 947	102, 779	6, 997, 860
December	931, 287	812, 554	1, 573, 178	3, 253, 290	119, 356	6, 689, 665
	10, 336, 698	5, 446, 962	10, 352, 835	30, 716, 282	721, 721	57, 574, 498

NEW ENGLAND MOVEMENT

New England is supplied with coal partly by coastwise shipments from the principal coal ports and partly by all-rail shipments across the Hudson. Coal may also be obtained by sea from other countries but under ordinary conditions of the market the quantity imported is small. The origin of the coastwise shipments in 1926 was discussed in the preceding section, and in the bureau's weekly coal report will be found a current record of the cars of coal, both anthracite and bituminous, forwarded to New England through the rail gateways of Harlem River, Maybrook, Albany, Rotterdam, Mechanicsville, and Rouses Point. Tables 66 and 67 show the quantities actually received in New England, according to records maintained by the Massachusetts Special Commission on the Necessaries of Life.

Table 66 traces the volume of the supplies reaching New England during each month of 1925 and 1926, including the period of the great anthracite strike. In the last two months before the strike the receipts of anthracite both by tide and rail increased sharply, as consumers laid in reserves in anticipation of the suspension. In August, 1925, the total receipts of anthracite amounted to 1,302,197 net tons. Soon after the strike began, on September 1, the monthly receipts fell to barely a hundred thousand tons, consisting chiefly of pea and smaller sizes shipped from the storage yards. As the supply of anthracite fell off, the receipts of bituminous coal increased, reaching a maximum of 2,184,892 tons in December.

After the settlement of the strike in February, 1926, shipments of anthracite were resumed promptly, and the receipts in March amounted to 1,139,278 tons. It was, however, some weeks before the shortage of domestic fuel was entirely overcome, and receipts of bituminous coal in March were also high, showing an increase of half a million tons over those in March, 1925.

TABLE 66.—*Receipts of coal in New England, by months, 1925–26, in net tons*[1]

	Anthracite			Bituminous		
	By tide-water	All-rail	Total	By tide-water	All-rail	Total
1925						
January	192,700	545,510	738,210	1,033,654	618,962	1,652,616
February	154,144	669,832	823,976	1,090,333	673,791	1,764,124
March	230,409	389,957	620,366	1,270,498	560,481	1,830,979
April	239,590	528,216	767,806	894,872	397,911	1,292,783
May	278,259	708,890	987,149	896,179	473,110	1,369,289
June	292,135	629,940	922,075	1,171,797	493,746	1,665,543
July	319,908	775,609	1,095,517	1,103,517	531,543	1,635,060
August	397,578	904,619	1,302,197	1,175,260	629,666	1,804,926
September	199,377	392,710	592,087	1,116,499	699,002	1,815,501
October	90,021	106,459	196,480	1,276,773	860,394	2,137,167
November	51,485	58,002	109,487	1,258,416	901,597	2,160,013
December	98,625	26,062	124,687	1,268,725	916,167	2,184,892
	2,544,231	5,735,806	8,280,037	13,556,523	7,756,370	21,312,893
1926						
January	93,989	17,771	111,760	1,162,608	691,156	1,853,764
February	104,070	37,355	141,425	1,052,500	718,727	1,771,227
March	340,039	799,239	1,139,278	1,475,757	905,403	2,381,160
April	312,795	695,098	1,007,893	1,121,533	479,249	1,600,782
May	290,982	746,705	1,037,687	1,014,553	491,867	1,506,420
June	285,202	788,776	1,073,978	952,251	470,170	1,422,421
July	305,408	752,134	1,057,542	850,975	479,961	1,330,936
August	266,135	697,784	963,919	945,286	579,958	1,525,244
September	268,584	713,306	981,890	1,026,660	607,986	1,634,646
October	314,419	833,143	1,147,562	1,075,126	679,778	1,754,904
November	266,696	844,091	1,110,787	1,150,366	921,451	2,071,817
December	224,872	609,089	833,961	1,194,495	1,019,077	2,213,572
	3,073,191	7,534,491	10,607,682	13,022,110	8,044,783	21,066,893

[1] From records of Massachusetts Special Commission on the Necessaries of Life.

The total receipts of anthracite in New England during 1926 were 10,608,000 net tons, of which 3,073,000 tons came by tide and 7,535,000 all-rail. The total receipts of bituminous coal were 21,067,000 tons, 13,022,000 coming by tide and 8,045,000 all-rail. Twenty-nine per cent of the anthracite and 61.8 per cent of the bituminous coal thus came in by tidewater. With respect to anthracite, the per cent by tide has shown little change in recent years, but with respect to bituminous coal, it has sharply increased. In 1919 only 46.9 per cent of the bituminous receipts arrived by water, while in 1926 the corresponding figure was 61.8 per cent. (Table 67.) The shift from rail to water has been caused in part by a decline in vessel rates in comparison with rail rates and in part by changes in the districts from which New England buys its coal.

TABLE 67.—*Receipts of coal in New England, by years, 1919–1926* [1]

	Anthracite			Bituminous		
	By tide-water	All-rail	Total	By tide-water	All-rail	Total
Net tons:						
1919	3,310,000	7,268,000	10,578,000	8,527,000	9,655,000	18,182,000
1920	3,521,000	7,734,000	11,255,000	10,211,000	12,223,000	22,434,000
1921	3,695,000	7,679,000	11,374,000	8,814,000	8,374,000	17,188,000
1922	2,060,000	4,411,000	6,471,000	12,996,000	5,812,000	18,808,000
1923	4,082,000	8,103,000	12,185,000	14,050,000	9,634,000	23,684,000
1924	3,325,000	7,286,000	10,611,000	11,892,000	6,985,000	18,877,000
1925	2,544,000	5,736,000	8,280,000	13,557,000	7,756,000	21,313,000
1926	3,073,000	7,535,000	10,608,000	13,022,000	8,045,000	21,067,000
Per cent:						
1919	31.3	68.7	100.0	46.9	53.1	100.0
1920	31.3	68.7	100.0	45.5	54.5	100.0
1921	32.5	67.5	100.0	51.3	48.7	100.0
1922	31.8	68.2	100.0	69.1	30.9	100.0
1923	33.5	66.5	100.0	59.3	40.7	100.0
1924	31.3	68.7	100.0	63.0	37.0	100.0
1925	30.7	69.3	100.0	63.6	36.4	100.0
1926	29.0	71.0	100.0	61.8	38.2	100.0

[1] From records of Massachusetts Special Commission on the Necessaries of Life.

This change in the sources of New England's supply of bituminous coal has led to many requests upon the bureau for more detailed information on the subject, to meet which Table 68 has been prepared. The table shows by months from 1919 to 1926 the quantity received in New England all-rail and the quantity dispatched to New England by coastwise vessels from each of the five coal ports. The outstanding features of the table are the rise in the coastwise movement coincident with the decline of the all-rail movement already referred to and the growth of the movement from Hampton Roads and Baltimore at the expense of that from New York.

TABLE 68.—*Monthly coastwise shipments of bituminous coal to New England from Hampton Roads, Baltimore, Philadelphia, New York, and Charleston and monthly receipts of bituminous coal all-rail in New England, 1919–1926, in net tons*

Year and month	Coastwise shipments to New England [1]						All-rail receipts in New England [2]
	Hampton Roads	Baltimore	Philadelphia	New York	Charleston	Total, all ports	
1919							
January	425,248	57,919	26,358	211,017	----------	720,542	652,116
February	315,313	14,992	23,510	199,938	----------	553,753	595,135
March	339,564	3,976	12,123	134,829	----------	490,492	603,794
April	419,355	8,452	25,013	182,351	----------	635,171	728,906
May	457,169	6,925	59,846	248,390	----------	772,330	777,352
June	445,367	6,860	97,234	240,976	----------	790,437	803,005
July	390,274	3,438	81,742	235,735	----------	711,189	1,049,552
August	516,093	5,864	34,159	282,690	----------	838,806	1,010,989
September	508,654	6,738	52,569	270,670	----------	838,631	1,244,608
October	352,839	3,200	38,011	262,554	----------	656,604	1,308,727
November	543,742	8,688	3,229	147,477	----------	703,136	372,247
December	519,994	2,259	38,612	93,869	19,557	674,291	504,592
	5,233,612	129,311	492,406	2,510,496	19,557	8,385,382	9,654,623
1920							
January	614,994	6,751	39,440	138,955	3,452	803,592	776,338
February	605,848	2,444	58,824	126,382	----------	793,498	595,747
March	626,738	16,028	88,673	222,876	----------	954,315	824,329
April	475,784	53,805	54,821	132,169	----------	716,579	684,112
May	482,577	52,139	132,433	109,143	----------	776,292	990,151
June	486,809	39,051	69,587	176,990	----------	772,437	879,182
July	567,419	101,343	55,960	282,164	----------	1,006,886	1,432,344
August	558,161	115,260	38,246	336,547	----------	1,048,214	1,446,877
September	515,030	140,907	62,893	388,592	----------	1,107,422	1,152,515
October	367,275	111,466	64,694	295,083	----------	838,518	1,190,694
November	414,646	60,887	59,083	253,938	3,175	791,729	1,074,505
December	426,451	82,891	83,885	253,740	----------	846,967	1,160,000
	6,141,732	782,972	808,539	2,716,579	6,627	10,456,449	[3] 12,206,794
1921							
January	331,385	73,475	50,893	182,681	----------	638,434	981,000
February	309,677	50,466	28,189	129,805	----------	518,167	721,000
March	363,845	86,163	20,016	113,746	----------	583,770	741,000
April	407,604	87,287	25,772	111,648	----------	632,311	586,000
May	359,920	68,600	45,927	103,244	3,242	580,933	650,000
June	504,894	72,290	44,213	98,930	----------	720,327	799,000
July	445,256	78,712	45,910	103,321	----------	673,199	634,000
August	649,527	81,906	49,123	117,727	----------	898,283	690,000
September	590,142	90,670	43,210	84,878	----------	808,900	644,000
October	701,665	84,902	58,313	142,220	----------	987,100	644,000
November	683,892	97,301	61,995	97,466	----------	940,654	712,000
December	666,874	100,439	45,904	63,334	----------	876,551	572,000
	6,014,681	972,241	519,465	1,349,000	3,242	8,858,629	8,374,000
1922							
January	716,632	63,268	41,792	58,448	----------	880,140	532,000
February	839,371	67,544	21,254	89,019	----------	1,017,188	753,000
March	1,160,788	59,073	47,962	116,254	----------	1,384,077	379,000
April	807,438	15,794	7,288	42,399	----------	872,919	322,000
May	767,994	----------	7,019	15,773	16,464	807,250	148,000
June	837,326	----------	2,604	10,626	25,824	876,380	117,000
July	663,233	----------	9,333	16,184	21,624	710,374	112,000
August	711,308	4,504	4,275	40,531	754	761,372	174,000
September	736,311	48,423	27,980	124,515	----------	937,229	889,000
October	654,470	45,302	44,587	119,118	4,283	867,760	792,000
November	529,738	136,116	32,761	108,403	9,785	816,803	694,000
December	663,796	166,144	36,923	84,407	9,699	960,969	600,000
	9,088,405	606,168	283,778	825,677	88,433	10,892,461	5,812,000

[1] Quantity loaded into vessels over tidewater piers as reported by railroads serving the ports indicated.
[2] From records of Massachusetts Special Commission on the Necessaries of Life.
[3] The total of the monthly reports for 1920 does not agree exactly with the final accepted total for the year shown elsewhere. The discrepancy is slight.

TABLE 68.—*Monthly coastwise shipments of bituminous coal to New England from Hampton Roads, Baltimore, Philadelphia, New York, and Charleston and monthly receipts of bituminous coal all-rail in New England, 1919–1926, in net tons*—Continued

Year and month	Coastwise shipments to New England [1]						All-rail receipts in New England [2]
	Hampton Roads	Baltimore	Philadelphia	New York	Charleston	Total, all ports	
1923							
January	767,442	146,200	67,903	135,019	9,332	1,125,896	665,000
February	795,434	98,718	40,743	134,405	16,007	1,085,307	664,000
March	1,038,636	105,461	48,092	138,145	4,658	1,334,992	785,000
April	927,870	81,752	41,681	171,401	9,847	1,232,551	798,000
May	717,630	113,742	114,858	182,493	.....	1,128,723	912,000
June	707,720	178,418	119,674	137,690	.....	1,143,502	1,055,000
July	755,938	97,524	113,775	121,158	.....	1,088,395	917,000
August	927,421	75,069	84,883	134,538	.....	1,221,911	1,012,000
September	813,290	79,657	75,533	131,382	.....	1,099,862	864,000
October	758,364	84,727	54,428	112,803	.....	1,010,322	807,000
November	631,927	70,159	68,518	95,347	3,352	869,303	544,000
December	786,544	70,354	64,275	112,383	.....	1,033,556	671,000
	9,628,216	1,201,781	894,363	1,606,764	43,196	13,374,320	9,634,000
1924							
January	778,738	65,904	49,006	103,365	3,471	1,000,484	667,624
February	783,326	70,631	56,918	96,719	.....	1,007,594	712,868
March	833,353	80,820	55,834	96,055	.....	1,066,062	693,845
April	595,311	42,673	17,741	76,988	.....	732,713	378,590
May	553,279	34,513	31,628	73,200	.....	692,620	428,261
June	622,974	23,727	34,578	69,537	.....	750,816	464,398
July	703,268	34,983	43,438	71,419	.....	853,108	498,812
August	855,334	36,866	35,368	86,435	.....	1,014,003	561,916
September	845,598	48,560	33,649	81,052	.....	1,008,859	603,667
October	928,414	74,451	50,714	89,242	.....	1,142,821	648,906
November	889,771	42,141	54,673	70,345	.....	1,056,930	602,753
December	987,067	24,419	48,474	102,258	.....	1,162,218	723,472
	9,376,433	579,688	512,021	1,016,615	3,471	11,488,228	6,985,112
1925							
January	950,156	57,382	40,823	75,720	.....	1,124,081	618,962
February	940,517	45,575	48,011	73,083	.....	1,107,186	673,791
March	1,087,651	47,675	48,442	88,131	.....	1,271,899	560,481
April	709,094	51,284	28,735	68,142	.....	857,255	397,911
May	734,141	59,146	26,298	68,626	.....	888,211	473,110
June	829,549	66,103	35,284	76,559	.....	1,007,495	493,746
July	882,746	86,045	36,656	78,045	.....	1,083,492	531,543
August	1,000,847	83,838	36,200	93,550	.....	1,214,435	629,666
September	927,672	50,348	59,671	100,135	.....	1,137,826	699,002
October	1,109,526	78,845	33,548	99,338	.....	1,321,257	860,394
November	1,023,400	68,475	35,134	105,264	.....	1,232,273	901,597
December	1,010,914	70,852	37,377	98,909	.....	1,218,052	916,167
	11,206,213	765,568	466,179	1,025,502	.....	13,463,462	7,756,370
1926							
January	976,372	77,937	35,422	43,709	.....	1,133,440	691,156
February	907,968	60,395	17,054	46,564	.....	1,031,981	718,727
March	1,152,540	97,098	34,524	86,491	.....	1,370,653	946,403
April	862,499	71,394	30,839	54,920	.....	1,019,652	479,249
May	865,234	76,942	22,900	68,453	.....	1,033,529	491,867
June	710,313	117,047	20,992	76,900	.....	925,252	470,170
July	711,070	57,605	24,979	83,453	.....	877,107	479,961
August	749,864	70,859	46,634	60,765	.....	928,122	579,958
September	806,813	74,005	69,612	76,953	.....	1,027,383	607,986
October	885,307	90,101	84,173	105,739	.....	1,165,320	679,773
November	860,980	78,810	53,649	147,456	.....	1,140,895	921,451
December	1,016,895	105,279	51,889	121,512	.....	1,295,575	1,019,077
	10,505,855	977,472	492,667	972,945	.....	12,948,959	8,044,784

[1] Quantity loaded into vessels over tidewater piers as reported by railroads serving the ports indicated.
[2] From records of Massachusetts Special Commission on the Necessaries of Life.

IMPORTS AND EXPORTS[37]

IMPORTS

The exigencies of supply and trade make the United States both an importer and exporter of coal. Although this country has a large exportable surplus, there are districts in the Northwest that depend upon supplies from Canada. Many others of the principal coal-producing countries import as well as export coal. This condition in the movement of coal across international boundary lines is inherent in the trade of any commodity of low value per unit of weight, and the distribution of such a commodity in world trade is governed more by the cost of transportation than by tariff regulations.

Under normal conditions of trade and production imports into the United States fluctuate but little from month to month or from year year. They consist almost entirely of bituminous coal from Vancouver Island and Alberta received in Washington, Montana, and Idaho, and of small quantities of coal brought to Pacific ports as ballast in vessels from Australia and Japan.

Imports of bituminous coal in 1926 were 486,000 net tons, which represented a decrease of 19.3 per cent from 1925 and an increase of 16.4 over 1924. The general world demand for coal following the British strike had very little effect upon imports of bituminous coal; monthly receipts in the last half of the year were only slightly lower than during the same period in 1925. A small increase is noted in the shipments received from Asia. Japan supplied a larger tonnage than during any of the preceding four years.

In ordinary years the quantity of anthracite imported has been insignificant, but in 1926 for the first time the imports of anthracite exceeded those of bituminous coal. Occasionally great strikes create a shortage of coal in the United States severe enough to stimulate imports from Europe, as in 1902 and in 1922. This was true in 1926. The anthracite suspension, which began in 1925, extended into 1926 for 39 working days and created a shortage of household fuels in the eastern United States. In response to this demand shipments of foreign anthracite into the northeastern and central seaboard areas increased during the last part of 1925 and continued to be unusually heavy during the first three months of 1926. Although receipts fell off heavily after the cessation of labor difficulties, the impetus gained during the first few months carried anthracite imports to a new high mark in 1926. From the abnormal figure of 300,000 net tons in 1923 imports of anthracite dropped to 118,000 tons in 1924, rose to 382,900 tons in 1925 because of conditions during the later months, and reached a record of 814,000 tons in 1926. Receipts for March, as reported by the Bureau of Foreign and Domestic Commerce, were 342,600 net tons, a quantity for one month which exceeded the totals for three out of the preceding four years. From Table 69 it will be seen that the largest share of the abnormal sea-borne imports in 1926 came from South Wales and Scotland. Not the least interesting feature of the import trade in 1926 was the receipt of 27,900 tons of anthracite from Belgium and of 53,700 tons, which probably originated in the Ruhr, from the Netherlands. The foreign anthracite

[37] The tables of imports and exports have been compiled by J. A. Dorsey, of the Bureau of Mines, from the records of the Bureau of Foreign and Domestic Commerce.

was delivered principally in the coastal cities of New England and in New York.

The connection between record importations of anthracite in 1926 and the longest suspension of activity in the history of the anthracite region [38] is more than a coincidence. International trade responds but slowly to a new turn in events. Switching one's source of supply to a foreign country is not done overnight. There is uncertainty in the chance that the labor difficulties responsible for a domestic shortage may be settled at any time; in which event outside supplies will not be needed. A shortage in supply must continue or promise to continue for some time before business men either have the time to arrange for foreign supplies or consider the risk in importing coal sufficiently reduced to engage in such business on any large scale. But once started, imports can not be turned off by a mere twist of a faucet; contracts are not easily canceled, and the unwanted cargoes under way can not be turned back. By the 1st of January, 1926, the anthracite industry had already lost approximately 100 working days, and it was apparent that the shortage in high-grade household fuel would continue throughout most of the winter, even were the suspension ended immediately. Following this reduction in the risk of importing, large dealers in eastern cities sought abroad substitutes for domestic hard coal. Imports of anthracite rose from 17,200 net tons in October, 1925, to 208,900 tons in December and continued heavy into 1926 at 151,400, 235,800, and 342,600 net tons, respectively, for the first three months of the year. The suspension ended in February, but receipts of foreign anthracite the following month, under the impetus of contracts already signed and cargoes under way, set a new record. By this time, however, there was no longer the feeling of apprehension that had assisted to maintain a relatively high-price structure until the February settlement. Prices declined, although resumption of work in the anthracite region by no means assured a large immediate supply. Dealers disposed of their imported coal at lower prices than they had anticipated. The very factors that made for the tardy response of the import trade to the first demands had created a momentum that delayed readjustment after the end of the suspension.

EXPORTS

GENERAL FEATURES

The exports of coal from the United States far exceed the imports. The quantity of anthracite exported is relatively constant—about 4,000,000 net tons a year, destined mainly for Canadian consumption. The exports of bituminous coal in recent years have ranged from 12,400,000 net tons in 1922 to 35,300,000 tons in 1926.

In considering exports the trade of the United States with Canada must be distinguished from that with other countries. Except for the small shipments to Mexico, the coal trade with other countries is sea borne. The chief characteristic of this sea-borne trade during recent years is its uncertainty, for it is relatively new, fluctuating, and at times speculative. It varies with the buying power of, and

[38] See market review on anthracite, p. 432.

labor difficulties in, other countries, and more particularly with the prices at which European coal is available for export and with the freight rates prevailing for ocean transport. The trade with Canada, on the other hand, is stable and of long standing.

Although Canada is richly endowed with low-rank bituminous coal and lignite—the reserves being estimated at approximately 16 per cent of the world's supply[39]—her fields of high-rank coals are confined to the Maritime Provinces of Nova Scotia and New Brunswick on the east and British Columbia on the west. In the Prairie Provinces are enormous reserves of low-rank bituminous coal and lignite, but a great stretch of central Canada is without coal of any grade. This area—the most densely populated and highly industrialized part of the Dominion—has for many years depended chiefly upon the mines of the United States, normally purchasing about 4,000,000 net tons of anthracite and 12,000,000 to 17,000,000 tons of bituminous coal. Probably no part of the coal trade of the United States proceeds more steadily than the export movement to Canada. The coal moves year after year to the same destinations, over the same transportation routes, and often through the same wholesale channels. Large Canadian consumers have even acquired mines in the United States. The fluctuations in the quantity shipped to Canada from one year to the next are no greater than those in the domestic consumption of the United States, for the business conditions in the two countries are, as a rule, nearly alike.

In contrast to the trade with Canada, the sea-borne export coal trade of the United States is beset with many uncertainties. In pre-war days it averaged 4,000,000 net tons a year. The war at first stimulated but later curtailed exports, as the activity of submarines cut deeply into the world's supply of shipping. In 1919 off-shore exports were high, amounting to 8,050,000 tons. The following year they reached a record of 22,059,000 net tons on the crest of an unprecedented export demand, caused by the action of the British Government in limiting exports at a time when consumption in Europe was at a high level. In the face of a world-wide industrial depression in 1921, sea-borne shipments fell to 9,541,000 tons and would have dropped still further but for the fact that for three months exports from the United Kingdom were practically cut off by a strike in that country. In the following year conditions were reversed. The mines of Britain remained at work while those of America were closed by the great strike of 1922, affecting both the anthracite and the union bituminous fields, and off-shore exports fell to 1,475,000 tons. Recovery after 1922 was slow, and for three years, from 1923 to 1925, the overseas movement continued at about the pre-war level of 4,000,000 tons. In 1926 another great strike in Great Britain set up a demand for American coal, and sea-borne exports increased fivefold. Eight years of postwar experience have thus shown that labor disputes on one side of the Atlantic or the other are the chief cause of uncertainty in the sea-borne coal trade of the world, and except during shortages in Europe the overseas demand for American coal has been small.

[39] Cook, S. J., "Canadian coal industry improves position in 1926": Coal Age, vol. 31, No. 4, Jan. 27, 1927, p. 172.

Most of the sea-borne exports are bituminous coal rather than anthracite, and the trade is largely confined to Atlantic ports—Hampton Roads, Baltimore, Philadelphia, and Charleston. New York ordinarily plays little part in the export trade proper, but is one of the leading bunkering ports for vessels engaged in foreign commerce.

TRADE WITH CANADA

Exports to Canada in 1926 continued with characteristic stability. From 12,655,000 net tons in 1924 and 13,421,000 tons in 1925, shipments of bituminous coal into Canada increased slightly to 13,634,000 net tons in 1926. This, however, represents a decrease from 1923, when the Canadian trade reached its postwar peak. Although Canada drew most of its imported coal from the United States in 1926, it also received about 360,000 tons from other countries, including 276,000 tons from Great Britain and the rest, in almost equal amounts, from Germany and the Netherlands. Also, some European coal received through ports of the United States eventually found its way into Canada.[40] The long suspension in British mining in 1926 was a retarding factor in the newly developed trade between Great Britain and Canada, which had been greatly stimulated by the suspensions of 1922 and of 1925 and 1926 in the United States.

Exports of anthracite to Canada in 1926 were 3,942,000 tons, closely approximating the average for the past five years. From Table 71 it is seen that the suspension of activity in the anthracite regions during the first month and a half of 1926 inposed only a temporary check on anthracite exports, and that an increase in shipments after March recovered any ground lost during the first two months.

SEA-BORNE EXPORT TRADE

A large export demand for coals from the United States, which became the outstanding event in the coal market in 1926, followed the vacuum in world supply arising out of the seven months' suspension of production in Great Britain. Total sea-borne exports of bituminous coal for the year reached 21,510,000 net tons, only slightly under the record figure set in 1920 and an increase of approximately 450 per cent over 1925. In addition, the quantity of bunker coal loaded in vessels engaged in foreign trade in 1926 was about 2,500,000 tons above the total for any one of the four years preceding, although less than that reported for 1920 and 1921. No significant changes in sea-borne exports of anthracite occurred in 1926.

The greater part of the increase in overseas shipments in 1926 went to Europe, particularly to the United Kingdom, Irish Free State, Italy, and France. Nearly every country of the Old World purchased more from American exporters, and the net increase in the European market was 14,000,000 tons, most of which replaced British coal. Exports to most of the South American countries also increased greatly, and those to Argentina, Brazil, and Uruguay were most important in terms of quantity. Shipments of American coals to Chile declined, and that country drew upon its own production

[40] Cook, S. J., "Canadian coal industry improves position in 1926": Coal Age, vol. 31, No. 4, Jan. 27, 1927, p. 172.

for supplies in the domestic market and for exports to Argentina. Total gains in the South American market measured over 1,500,000 net tons, an amount sufficiently important to encourage efforts at holding permanently a share of the displaced British tonnage. Exports to Africa increased approximately 900,000 tons, and the principal customers were Egypt, Canary Islands, Algeria and Tunisia, Portuguese Africa, and French Africa. There were also unimportant increases in shipments to Asia and Oceania.

The constant increase in sea-borne shipments throughout 1926 is shown in Table 71. There was a continuous growth month by month until the maximum was reached in November. Pronounced increases occurred in June and July, when shipments were approximately double the totals for previous months. Off-shore exports in November set a record—3,722,095 net tons [41]—exceeding by almost a million tons the highest monthly total for sea-borne exports in any previous year; shipments in this month alone exceeded those for the 12 months of 1922 and were not far below the total sea-borne tonnage for each of the past three years.

Record activity in ports along the north and south Atlantic seaboard was reported in 1926. The abnormal offshore demand was largely responsible for a tremendous increase over 1925 in the tonnages handled at Hampton Roads, Baltimore, and Philadelphia, for the largest share of the sea-borne exports moved through these ports. Among the south Atlantic cities Charleston, S. C., was the most important shipper of coal to foreign countries; 581,000 net tons moved through this port, of which 232,500 tons went to the United Kingdom, 175,500 tons to Cuba, 116,800 tons to Argentina, and 34,000 tons to Brazil. Not the least interesting feature of the bituminous sea-borne trade in 1926 was the movement of 54,700 tons through New Orleans destined mainly for Italy and France, and a portion of this coal was reported as originating in southern Illinois.

TABLE 69.—*Anthracite imported, by countries and districts, 1922–1926, in net tons*

[Compiled from the records of the Bureau of Foreign and Domestic Commerce]

Country and district	1922	1923	1924	1925	1926
COUNTRY OF ORIGIN					
Africa: British—West	224				
Algeria and Tunisia		168			
Australia	8,427	11,828	1,836	4,480	
Belgium				5,684	27,910
Brazil					2
British West Indies (other)			4	12	
Canada	21,220	19,118	16,249	6,834	9,696
China	3	1,037		112	
Cuba				1	
France					2,779
Germany	901			36,636	198,011
Japan, including Chosen			168	3,946	(a)
Mexico		99	94		
Netherlands			448	6,485	53,730
Peru	1				
Spain	34				
United Kingdom:					
England	202,718	253,828	99,152	318,592	521,827
Scotland		14,282			
Venezuela					1
Virgin Islands of the United States				112	
	233,528	300,360	117,951	382,894	813,956

[a] Less than 1 ton.

[41] Total exports for November minus shipments to Canada and Mexico.

TABLE 69.—*Anthracite imported, by countries and districts, 1922-1926, in net tons*—Continued

Country and district	1922	1923	1924	1925	1926
DISTRICT OF ENTRY					
Alaska	1				3
Buffalo		176	16	722	746
Connecticut		7,549			11,985
Dakota	311	7,650	8,164	724	56
Duluth-Superior	7,940	31	38	64	300
Florida				1	
Hawaii				3,492	
Los Angeles		220			
Maine and New Hampshire	32,031	35,505	22,524	47,543	135,408
Maryland	37,284	16,377	8,296		3,743
Massachusetts	32,791	83,988	47,006	117,057	210,918
Michigan	540	571	317	58	
Montana-Idaho		3,609	5,646	300	
New Orleans	224		7		
New York	74,525	98,048		145,168	393,930
Ohio					1
Oregon	3	2,789	1,959		
Philadelphia		14,869		2,789	27,375
Porto Rico			4	124	
Rhode Island	26,967	17,306	23,110	58,531	29,056
St. Lawrence	54	67		383	178
San Antonio		99	94		
San Francisco	9,547	9,180	493	4,934	9
South Carolina		224			
Vermont	532	235		892	92
Washington	10,778	1,867	277	112	156
	233,528	300,360	117,951	382,894	813,956

TABLE 70.—*Bituminous coal exported, by countries, 1922-1926, in net tons* [1]

[Compiled from the records of the Bureau of Foreign and Domestic Commerce]

Country	1922	1923	1924	1925	1926
North America:					
Bermuda	15,968	16,936	20,206	13,470	23,122
British Honduras	1,900	1,633	429	391	562
Canada	10,836,347	16,854,257	12,654,869	13,421,007	13,633,513
Central America—					
Costa Rica	2,470	3,343	3,836	2	5,657
Guatemala	670	134	668	3,401	430
Honduras	6,512	1,719	2,154	2,018	1,302
Nicaragua	979	3,974	5,990	2,567	5,126
Panama	116,993	21,577	264,123	349,312	445,305
Salvador	34	3	72	69	128
Greenland	224				
Mexico	101,983	106,006	91,507	125,804	128,633
Miquelon and St. Pierre Islands		9,473	3,730	12,443	14,885
Newfoundland and Labrador	2,388	37,612	100,869	109,659	83,545
West Indies—					
British—					
Barbados	20,904	29,974	39,141	37,583	39,334
Jamaica	31,028	35,035	46,042	56,073	159,533
Trinidad and Tobago	19,618	23,885	28,326	26,180	59,353
Other British West Indies	13,938	24,879	19,031	36,745	50,079
Cuba	519,521	683,893	598,921	694,125	615,721
Dominican Republic	7,893	4,655	3,716	8,028	13,588
Dutch West Indies	32,334	60,282	60,453	86,090	81,189
French West Indies	60,474	87,367	147,338	139,385	127,047
Haiti	3	2,988	234	67	8,143
Virgin Islands of the United States	15,683	35,093	61,984	70,743	95,118
	11,807,864	18,044,718	14,153,639	15,195,162	15,591,313
South America:					
Argentina	88,448	146,793	220,058	164,712	1,115,526
Bolivia		584			14,112
Brazil	170,389	348,011	850,234	657,888	1,333,640
Chile	52,546	21,984	61,940	27,280	3,405

[1] Amounts stated do not include fuel or bunker coal loaded on vessels engaged in the foreign trade, which aggregated, in 1922, 4,614,632 tons; in 1923, 5,093,024 tons; in 1924, 4,460,412 tons; in 1925, 4,865,521 tons; and in 1926, 7,735,606 tons.

TABLE 70.—*Bituminous coal exported, by countries, 1922–1926, in net tons*—Con.

Country	1922	1923	1924	1925	1926
South America—Continued.					
Colombia	6,325	4,542	1,556	1,581	18,669
Ecuador	4,613	2,238	3,423	1,157	9,088
Falkland Islands					11,862
Guiana—					
British	3,642	12,282	18,314	17,352	21,703
Dutch	2,129	2,659	2,913	2,726	5,645
French				258	
Paraguay			299		
Peru	15,488	11,222	21,410	21,462	29,683
Uruguay		32,810	68,803	22,194	145,601
Venezuela	26	2,190	2,598	811	20,592
	343,606	585,315	1,251,548	917,421	2,729,526
Europe:					
Azores and Madeira Islands					23,057
Belgium		91,280	17,164		
Denmark	3				68,346
France	13,453	943,789	471,401	261,751	544,145
Germany	2,939	375,772	29,488	6,896	1,273
Gibraltar					192,245
Greece	11,123	42,740	16,979		28,925
Iceland and Faroe Islands					4,716
Irish Free State					769,849
Italy	138,973	655,295	975,146	871,454	1,727,057
Latvia		13,259			8,716
Malta, Gozo, etc					30,903
Netherlands	2,841	424,397			31,674
Norway		2,844		2,402	92,133
Poland and Danzig					4,514
Portugal	1,421				163,372
Spain		40,989	3,799		18,751
Sweden		57,817			5,027
Turkey in Europe					40,754
United Kingdom—					
England	162	9,850	5,803	18,124	12,048,062
Scotland		20,116			
Ireland					
Yugoslavia and Albania					1,724
	170,915	2,678,148	1,519,780	1,160,627	15,805,243
Asia:					
China			4,355	3,006	
East Indies—					
British India			1,138	4,492	
Dutch			1,912		3,418
Far Eastern Republic	12				
Japan			1,978		194
Java and Madura			1,557		
Palestine and Syria					15,811
Philippine Islands			6,440		10,470
Russia in Asia	9		1	11	
Turkey in Asia		2,821			
	21	2,821	17,381	7,509	29,893
Africa:					
Algeria and Tunisia	7,869	76,925	38,859	35,607	152,73 1
British Africa—West	34	1,144	6,260	23,064	20,854
Canary Islands	1,782	2,452			290,303
Egypt	58,372	25,756	46,245	40,018	359,434
French Africa	22,622	15,710	54,905	78,677	122,185
Liberia					11
Morocco					19,706
Mozambique					3,920
Portuguese Africa					137,392
	90,679	121,987	146,269	177,366	1,106,536
Oceania:					
Australia		18,533		3,474	8,298
French				1	
New Zealand		1,587	4,349		1,128
Other British Oceania			7,381		
Other Oceania		470			
		20,590	11,730	3,475	9,426
Grand total	12,413,085	21,453,579	17,100,347	17,461,560	35,271,937

TABLE 71.—*Anthracite and bituminous coal exported to Canada and to all other countries, by months, 1925–26, in net tons*

[Compiled from the records of the Bureau of Foreign and Domestic Commerce]

	January	February	March	April	May	June	July
1925							
Anthracite:							
Canada	326,704	311,348	224,245	252,896	358,645	339,360	496,055
Overseas and all other	4,591	12,299	822	4,243	5,754	11,799	22,142
	331,295	323,647	225,067	257,139	364,399	351,159	518,197
Bituminous (not including bunker coal):							
Canada	796,501	657,670	741,980	655,602	1,122,015	1,163,080	1,467,258
Overseas and all other	300,960	261,186	287,016	337,260	397,750	445,210	378,944
	1,097,461	918,856	1,028,996	992,862	1,519,765	1,608,290	1,846,202
Fuel or bunker coal loaded on vessels engaged in foreign trade	364,368	328,848	352,379	395,527	448,477	441,752	458,843
1926							
Anthracite:							
Canada	6,904	41,508	321,833	324,441	359,727	425,944	428,525
Overseas and all other	164	104	11,158	5,737	6,599	5,861	7,512
	7,068	41,612	332,991	330,178	366,326	431,805	436,037
Bituminous (not including bunker coal):							
Canada	811,990	767,856	829,032	769,213	1,112,747	1,230,169	1,220,859
Overseas and all other	300,602	366,884	451,199	456,344	586,019	1,166,260	2,408,427
	1,112,592	1,134,740	1,280,231	1,225,557	1,698,766	2,396,429	3,629,286
Fuel or bunker coal loaded on vessels engaged in foreign trade	369,499	341,539	473,274	448,715	489,746	583,925	717,543

	August	September	October	November	December	Year
1925						
Anthracite:						
Canada	518,028	180,739	46,066	34,879	7,850	3,096,815
Overseas and all other	15,144	2,125	3,029	117	126	82,191
	533,172	182,864	49,095	34,996	7,976	3,179,006
Bituminous (not including bunker coal):						
Canada	1,509,883	1,507,787	1,179,698	1,347,708	1,271,825	13,421,007
Overseas and all other	503,432	316,641	215,307	306,559	290,288	4,040,553
	2,013,315	1,824,428	1,395,005	1,654,267	1,562,113	17,461,560
Fuel or bunker coal loaded on vessels engaged in foreign trade	497,346	420,809	394,611	381,209	381,352	4,865,521
1926						
Anthracite:						
Canada	431,318	396,909	504,011	378,530	322,068	3,941,718
Overseas and all other	10,833	9,376	10,291	13,169	7,161	87,965
	442,151	406,285	514,302	391,699	329,229	4,029,683
Bituminous (not including bunker coal):						
Canada	1,282,596	1,342,470	1,401,951	1,427,226	1,437,404	13,633,513
Overseas and all other	2,691,266	2,813,815	3,289,018	3,730,563	3,378,027	21,638,424
	3,973,862	4,156,285	4,690,969	5,157,789	4,815,431	35,271,937
Fuel or bunker coal loaded on vessels engaged in foreign trade	795,992	827,219	941,000	942,745	804,409	7,735,606

TABLE 72.—*Shipments of coal to Alaska, Hawaii, and Porto Rico, 1917–1926, in net tons*

[Compiled from the records of the Bureau of Foreign and Domestic Commerce]

Year	Alaska (all coal)	Hawaii (all coal)	Porto Rico (all coal)	Year	Alaska (all coal)	Hawaii (all coal)	Porto Rico (all coal)
1917	58,116	39,442	125,635	1922	28,457	846	55,356
1918	51,520	73,006	116,161	1923	34,082	25,344	49,302
1919	57,166	42,495	83,492	1924	40,161	49,074	58,434
1920	38,128	17,634	104,021	1925	37,324	4,906	72,224
1921	24,278	9,249	55,800	1926	35,620	10,885	120,457

WORLD PRODUCTION OF COAL

The world's output of coal in 1926 was in round numbers 1,365,000,000 metric tons, of which 185,000,000 tons was lignite and 1,180,000,000 anthracite and bituminous. The trend of world production is shown in Table 73 and Figure 15.

The change in coal demand which has already been noted for the United States (pp. 443 to 458) is even more striking in the record for the world as a whole. Before the war the production of coal (not including lignite) was growing at the rate of 31,000,000 metric tons a year. The increase, although interrupted by occasional depressions of general business, was one of the most constant and most remarkable facts of the world's economic life. Since August, 1914, the growth has seemingly stopped. The world output of anthracite and bituminous in 1925 was actually less than in 1913, whereas judging by all pre-war experience it should have been 370,000,000 tons greater.

There have been a number of years since the outbreak of the war in which the total tonnage of all coal (including lignite) exceeded that of 1913. In 1925 the grand total was 1,372,000,000 tons, against 1,342,000,000 in 1913. This comparison, however, ignores the fact that lignite is inferior in heating value. Reducing the deceptive tonnage figures to equivalent heating value, it is found that, even including lignite, the production of 1925 was slightly less than that of 1913. (Fig. 15.) The production of 1926 was still lower because of the British strike.

In the Old World the condition is very largely due to the economic dislocation wrought by the war. In almost all countries the former rate of increase in the production of goods was checked by the war, and among some of the former belligerents trade and industry have not regained the pre-war level. This fact alone is sufficient to retard the growth of coal consumption and in some countries to account for an absolute decrease; but the shock of the war, so familiar to everyone and so often emphasized, may be credited with too much of the change in coal demand. The tendencies of fuel economy and competition of other sources of power have also been at work. The advances in fuel efficiency, already shown for the United States in Figure 8, could be matched in other countries. The British electric utilities, for example, reduced their consumption of coal per kilowatt hour 26 per cent in four years.[42] The extent of competition of oil and water power is suggested by Figure 16. Although the

[42] Coal in 1925, p. 414, Table 14.

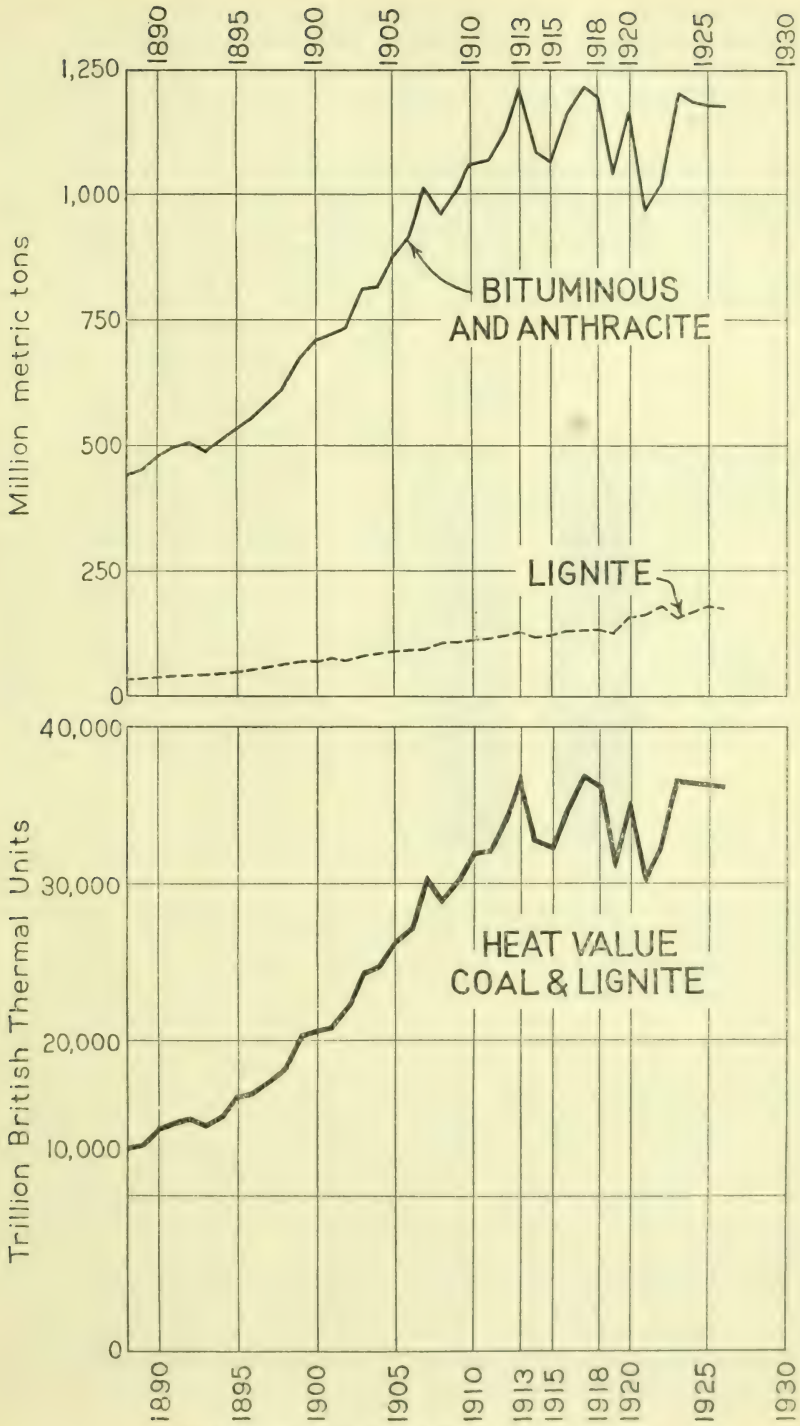

FIGURE 15.—World production of coal and lignite, 1888–1926

world consumption of coal and lignite decreased from 1913 to 1925, the total consumption of all energy materials increased by 17 per cent, entirely from oil and gas and water power. The production of water power has doubled since 1913 and the production of oil and natural gas much more than doubled. The increase in developed water power in 1925 over the pre-war figure was equivalent to a yearly consumption of 80,000,000 tons of coal. The increase in oil and gas, including gasoline and other refined products not competing directly with coal, was equivalent to 170,000,000 tons of coal.

The coal producers of Europe, in common with those of the United States, have thus faced the problem of adjusting an industry accustomed to a growing demand to the fact of an arrested demand. In other countries, as in the United States, production was increasing in the years before the war, although the rates of increase, of course, varied widely. This meant that year by year new miners had to be recruited and new workings opened, not merely to replace exhausted ones but to take care of the expected increase. Business might be slack for a while, but the growth of demand always helped to take up the slack. To such an industry the fact of a checking of growth may be quite as serious as an actual decline of output to stationary industries.

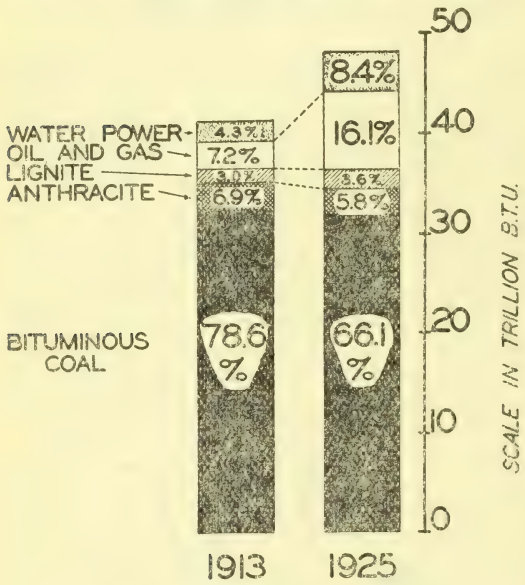

FIGURE 16.—World consumption of coal, oil, and water power, 1913 and 1925. (Because of the strike of the American anthracite miners in 1925 and the substitution of bituminous coal, the figure for anthracite used in the diagram represents the production of 1924, and the figure for bituminous coal has been adjusted accordingly)

These broad facts of supply and demand are an underlying cause of the depression prevailing in the coal markets of the world. Increasing fuel efficiency, competition of water power and petroleum, coupled with an absolute decline in the use of energy in some of the war-stricken areas and, on the other hand, an expansion of facilities for coal production, have brought about a widespread tendency to overproduction in coal. Overproduction is not the only factor in the depression, of course, but it is a fundamental one. Until about 1925 it was prevented by a series of accidents from manifesting itself. In 1919 the American miners were on strike; in 1920 and 1921 the British miners struck; in 1922 the whole unionized American industry was shut down for 5 months with the greatest strike in its history; in 1923 and 1924 the French occupied the Ruhr. During all this time the French mines had been prevented from producing their usual quota by the destruction wrought during the war, destruction which has only recently

been repaired. Thus, it was not until about 1925 that the underlying changes in the market were fully sensed. Then, with the fortuitous circumstances removed, they bore down on the coal industry with crushing weight and in both Europe and America produced severe depression.

TABLE 73.—*World production of coal and lignite, 1888–1926*

[All countries known to have produced coal are included. Estimates are included for China in the years 1888 to 1905 and for certain of the very small producing countries in the years for which no data were obtainable, but in no year does the tonnage estimated exceed 1.1 per cent of the total]

Year	Million metric tons			Heat value		Year	Million metric tons			Heat value	
	Coal	Lignite	Total	Trillion B. t. u.	Index numbers 1913=100		Coal	Lignite	Total	Trillion B. t. u.	Index numbers 1913=100
1888	442	33	475	13,226	36.0	1908	964	105	1,069	29,236	79.6
1889	450	36	486	13,513	36.8	1909	1,009	106	1,115	30,540	83.2
1890	478	38	516	14,343	39.1	1910	1,059	107	1,166	32,001	87.1
1891	498	40	538	14,942	40.7	1911	1,074	111	1,185	32,471	88.4
1892	503	41	544	15,098	41.1	1912	1,128	120	1,248	34,141	93.0
1893	491	43	534	14,795	40.3	1913	1,213	129	1,342	36,724	100.0
1894	514	45	559	15,498	42.2	1914	1,086	121	1,207	32,941	89.7
1895	542	48	590	16,331	44.5	1915	1,069	124	1,193	32,476	88.4
1896	557	51	608	16,806	45.8	1916	1,159	132	1,291	35,164	95.8
1897	584	55	639	17,636	48.0	1917	1,223	133	1,356	37,015	100.8
1898	614	59	673	18,565	50.6	1918	1,198	135	1,333	36,301	98.8
1899	673	62	735	20,297	55.3	1919	1,044	129	1,173	31,799	86.6
1900	708	69	777	21,386	58.2	1920	1,166	153	1,319	35,637	97.0
1901	725	75	800	21,967	59.8	1921	970	164	1,134	30,104	82.0
1902	741	73	814	22,395	61.0	1922	1,047	181	1,228	32,536	88.6
1903	813	76	889	24,509	66.7	1923	1,198	161	1,359	36,647	99.8
1904	820	79	899	24,746	67.4	1924	1,186	171	1,357	36,445	99.2
1905	865	84	949	26,102	71.1	1925	1,187	185	1,372	36,624	99.7
1906	924	90	1,014	27,884	75.9	1926	1,180	185	1,365	36,428	99.2
1907	1,019	99	1,118	30,748	83.7						

Table 74 gives production of coal by countries. It is based upon official reports supplemented where necessary by trade information.

TABLE 74.—*Coal and lignite produced in the principal countries of the world in the calendar years 1922–1926, in metric tons*

[Compiled by L. M. Jones, of the Bureau of Mines]

Country	1922	1923	1924	1925	1926
North America:					
Canada—					
Coal	10,587,611	12,163,901	9,138,841	8,927,519	11,687,032
Lignite	3,162,907	3,249,665	3,253,459	3,288,262	3,261,599
Greenland	2,100	2,117	2,500	2,100	1,500
Mexico	932,550	1,261,541	1,226,696	1,444,498	1,000,000
United States—					
Anthracite	49,607,344	84,675,282	79,765,491	56,079,281	76,599,968
Bituminous and lignite	388,973,174	512,161,770	438,790,754	471,781,446	520,147,061
South America:					
Argentina	[1]	[1]	[1]	[1]	[1]
Brazil	500,930	324,154	342,206	392,376	400,000
Chile	1,053,061	1,164,028	1,539,141	1,453,228	1,463,815
Colombia	[1]	[1]	[1]	[1]	[1]
Peru	294,492	[2] 253,000	151,785	101,081	165,979
Venezuela [3]	20,782	18,650	16,695	16,798	[1]

[1] Estimate included in total.
[2] Includes a small quantity of asphaltite.
[3] Exclusive of output of State of Falcon (about 8,000 tons), for which estimate is included in total.

TABLE 74.—*Coal and lignite produced in the principal countries of the world in the calendar years 1922–1926, in metric tons*—Continued

Country	1922	1923	1924	1925	1926
Europe:					
Austria—					
Coal	165,727	157,650	171,959	145,200	157,308
Lignite	3,135,902	2,685,467	2,785,816	3,033,378	2,957,728
Belgium	21,208,500	22,922,340	23,361,910	23,097,040	25,259,600
Bulgaria—					
Coal	46,725	61,600	69,670	73,000	62,150
Lignite	983,311	1,012,594	1,155,291	1,156,006	1,140,093
Czechoslovakia—					
Coal	10,464,990	12,347,251	15,178,942	12,558,992	14,176,998
Lignite	19,174,296	16,265,530	20,459,690	18,604,678	18,515,666
France—					
Coal	31,141,096	37,679,314	44,011,240	47,047,630	51,421,772
Lignite	772,014	877,123	944,080	1,007,270	1,056,200
Germany—					
Coal	[4] 129,964,597	62,316,134	118,768,748	132,622,125	145,295,724
Lignite	137,178,830	118,784,997	124,637,201	139,724,614	139,150,557
Saar [5]	11,240,000	9,192,275	14,032,120	12,989,850	13,680,874
Greece—					
Lignite	131,515	117,927	131,109	142,076	150,321
Hungary—					
Coal	941,380	793,075	744,394	805,019	826,906
Lignite	6,776,230	6,894,958	6,333,286	5,520,760	5,822,299
Italy—					
Coal	195,352	173,700	126,985	188,522	209,260
Lignite	745,402	953,460	917,491	1,105,474	1,181,342
Netherlands—					
Coal	4,866,371	5,595,478	6,180,182	7,116,970	8,842,687
Lignite	28,919	54,185	191,202	207,623	211,194
Poland—					
Coal	[6] 23,974,814	36,097,997	32,224,680	29,081,327	35,765,931
Lignite	219,983	171,035	88,038	65,675	76,026
Portugal—					
Coal	127,279	137,613	124,801	123,450	201,732
Lignite	14,380	15,952	8,121	16,970	30,699
Rumania—					
Coal	254,642	291,983	297,288	313,572	322,191
Lignite	1,861,579	2,229,410	2,479,083	2,615,278	2,731,362
Russia [7]—					
Coal	7,695,321	8,736,755	12,849,307	13,354,011	20,614,717
Lignite	1,163,789	1,329,825	1,059,754	983,020	1,605,327
Spain—					
Coal	4,435,843	5,971,446	6,127,586	6,117,342	6,536,087
Lignite	329,680	394,268	411,773	402,690	399,830
Spitzbergen	316,000	340,942	451,914	413,412	291,211
Sweden	378,861	419,569	437,856	263,879	383,673
Switzerland	4,000	[1]	[1]	[1]	[1]
Turkey—Lignite	[1]	[1]	[1]	2,000	5,113
United Kingdom—					
Great Britain	253,613,054	280,430,369	271,405,414	247,079,210	128,305,291
Ireland	[1]	[1]	[1]	[1]	[1]
Yugoslavia—					
Coal	101,861	136,267	131,633	178,456	190,814
Lignite	3,624,707	3,864,998	4,053,607	3,973,870	3,976,938
Asia:					
British Borneo	115,855	[1]	120,613	101,904	92,583
China	22,681,000	19,955,000	20,969,000	24,255,000	[1]
Chosen	317,330	279,978	399,415	634,257	682,896
Federated Malay States	286,351	322,994	378,778	414,634	471,736
India, British	19,316,112	19,972,376	21,514,131	21,239,892	21,336,204
Indo-China—					
Coal	983,240	1,051,497	1,231,315	1,357,231	1,284,661
Lignite	5,751	5,424	4,565	5,739	5,598
Japan (including Taiwan and Karafuto)—					
Coal	29,163,727	30,584,316	31,816,662	33,363,381	33,496,879
Lignite	166,302	151,462	176,764	169,426	161,134
Netherland East Indies	1,040,678	1,156,625	1,446,757	1,400,725	1,466,359
Philippine Islands	42,420	43,446	47,938	48,681	28,577
Russia [7]—					
Coal	1,717,108	1,837,632	1,796,649	1,629,555	2,875,741
Lignite	745,061	761,423	604,783	533,880	687,648
Straits Settlements (Labuan)			10	41	
Turkey	681,000	[1]	769,000	745,000	912,953

[1] Estimate included in total.
[4] Includes entire output of Upper Silesia for January to May, inclusive; for June to December, inclusive, only that part of the Province allocated to Germany.
[5] Mines under French control.
[6] Includes the output June to December, inclusive, of that part of Upper Silesia allocated to Poland.
[7] Year ended Sept. 30.

TABLE 74.—*Coal and lignite produced in the principal countries of the world in the calendar years 1922–1926, in metric tons*—Continued

Country	1922	1923	1924	1925	1926
Africa:					
Algeria	8,857	3,562	9,228	10,037	13,731
Belgian Congo	33,000	65,000	81,000	83,000	90,225
Nigeria	[8] 123,027	193,644	235,848	242,833	[9] 358,944
Portuguese East Africa				18,086	10,868
Rhodesia, Southern	467,787	559,999	591,526	689,201	874,140
Tunisia—Lignite	343	620	305		
Union of South Africa	9,271,948	11,252,305	11,819,988	12,321,728	12,949,950
Oceania:					
Australia—					
New South Wales	10,346,572	10,646,693	11,304,688	11,579,108	11,066,483
Queensland	973,903	1,077,686	1,141,143	1,196,067	1,240,657
Tasmania	70,349	82,014	77,208	83,609	104,000
Victoria—					
Coal	568,261	484,476	526,634	542,821	600,487
Lignite	91,853	118,764	129,536	890,535	973,310
Western Australia	445,480	427,466	428,635	444,482	482,440
New Zealand—					
Coal	983,981	950,715	1,102,418	1,044,726	1,215,590
Lignite	903,656	1,050,735	1,014,224	1,070,269	1,030,361
Total, all grades	1,228,000,000	1,359,000,000	1,357,000,000	1,372,000,000	1,365,000,000
Lignite (total of items shown above)	181,000,000	161,000,000	171,000,000	185,000,000	185,000,000
Bituminous and anthracite (by subtraction)	1,047,000,000	1,198,000,000	1,186,000,000	1,187,000,000	1,180,000,000

[8] Exports. [9] Year ended Mar. 31 of year following that stated.

DETAILED STATISTICS OF BITUMINOUS COAL, BY STATES AND COUNTIES

TABLES OF PRODUCTION, VALUE, MEN EMPLOYED, DAYS WORKED, AND OUTPUT PER MAN IN 1926

The following table (No. 75) presents detailed statistics for each coal-producing county from which three or more operators reported production. Where less than three reports were received the figures for two or more counties have been combined to avoid disclosing individual returns, unless permission to publish has been granted by the producers.

The series gives the details of total value of product, average value per ton, men employed by broad occupational groups, average number of days worked by the mines, and output per man per day. The figures include stripping operations as well as deep mines. Separate particulars for the stripping operations in each county are given in Table 42. If the reader will deduct the stripping figures as given in that table from the totals for all mines in the following table, he will find that the remainder represents the operations of the deep mines. By this means figures can be obtained for the deep mines separately in any State or county desired.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*

[Note that figures relate only to active mines of commercial size; no canvass made of wagon mines producing less than 1,000 tons]

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
ALABAMA														
Bibb	1,269,128	8,563	23,137		1,300,828	$3,196,000	$2.46	1,134	186	284	308	1,912	258	2.64
Blount	341,272	45,861	9,246		396,379	970,000	2.45	489	72	41	121	723	276	1.99
Etowah and St. Clair	877,750	5,762	38,340		921,852	2,052,000	2.23	519	103	149	143	914	281	3.59
Fayette and Marion	215,471	2,761	756		218,988	643,000	2.94	264	34	29	84	411	246	2.17
Jefferson	9,727,842	173,006	157,079	51,514	10,109,441	24,393,000	2.41	7,450	1,608	1,820	1,732	12,610	286	2.80
Shelby	732,984	20,977	5,498		759,459	2,587,000	3.41	934	185	119	244	1,482	257	2.00
Tuscaloosa	902,894	12,507	6,763		922,164	2,109,000	2.29	760	189	69	207	1,225	267	2.82
Walker	5,932,371	398,889	28,375		6,359,635	12,053,000	1.90	4,568	998	992	1,452	8,010	238	3.34
Winston	8,926	3,290			12,216	33,000	2.70	22	3	3	30	58	105	2.01
	20,008,638	671,616	269,194	51,514	21,000,962	48,036,000	2.29	16,140	3,378	3,506	4,321	27,345	266	2.89
ALASKA														
Total	82,000	4,450	850		87,300	$459,000	$5.26	47	8	24	52	131	221	3.02
ARIZONA														
Apache		624			624	$1,000	$1.60	1				1	90	6.93

ARKANSAS

Franklin	221,020	2,269	1,604	.....	224,893	$698,000	$3.10	162	29	30	224	445	136	3.72
Johnson	333,565	786	2,790	.....	337,141	1,497,000	4.44	583	65	161	259	1,068	97	3.26
Logan	222,221	400	1,430	.....	224,051	1,327,000	5.92	562	25	115	71	773	140	2.06
Pope	47,727	10,136	82	.....	57,945	332,000	5.73	110	4	10	38	162	150	2.38
Sebastian	589,124	2,149	9,286	.....	600,559	1,605,000	2.67	780	127	75	137	1,119	165	3.26
Other counties (Scott and Washington)	14,141	287	.....	.....	14,428	38,000	2.63	16	1	1	4	22	212	3.09
	1,427,798	16,027	15,192	.....	1,459,017	5,497,000	3.77	2,213	251	392	733	3,589	135	3.00

CALIFORNIA, IDAHO, AND OREGON

Total	6,768	10,700	1,240	.....	18,708	$70,000	$3.74	51	4	16	20	91	103	1.99

COLORADO

Boulder	524,030	65,494	30,026	.....	619,550	$1,529,000	$2.47	502	81	110	106	799	161	4.82
Delta	48,868	25,461	300	.....	74,629	211,000	2.83	70	6	6	15	97	139	5.54
Elbert and Jefferson	85,241	6,929	13,126	.....	105,296	214,000	2.03	79	14	7	15	115	166	5.52
El Paso	175,585	164,021	12,990	.....	352,596	794,000	2.25	232	25	29	35	321	216	5.08
Fremont	485,282	79,230	5,833	.....	570,345	2,316,000	4.06	695	173	105	182	1,155	177	2.79
Garfield	9,612	21,393	300	.....	31,305	86,000	2.75	32	2	3	5	42	248	3.00
Gunnison	541,429	6,353	26,859	.....	574,641	1,661,000	2.89	324	93	55	118	590	220	4.43
Huerfano	1,925,229	18,495	22,188	.....	1,965,912	6,405,000	3.26	1,710	276	302	465	2,753	205	3.48
La Plata	59,700	24,808	20	21,476	106,004	295,000	2.78	101	13	11	20	145	228	3.21
Las Animas	3,069,169	49,732	47,022	133,676	3,299,599	8,620,000	2.61	2,545	492	262	554	3,853	245	3.50
Mesa	95,427	20,205	.....	.....	125,632	290,000	2.31	117	10	11	20	158	210	3.78
Moffat	.....	4,950	.....	.....	4,950	11,000	2.22	4	1	1	1	7	157	4.50
Montezuma	.....	5,659	.....	.....	5,659	28,000	4.95	7	2	2	2	13	231	1.88
Routt	859,351	13,441	47,777	.....	920,569	3,257,000	3.54	654	77	162	268	1,161	[1] 80	[1] 9.88
Weld	1,692,820	81,541	39,571	.....	1,813,932	3,649,000	2.01	1,046	182	166	142	1,536	215	5.50
Other counties (Archuleta, Jackson, Montrose, Pitkin, and Rio Blanco)	51,937	11,525	3,144	.....	66,606	163,000	2.45	42	9	6	13	70	229	4.15
	9,623,680	609,237	249,156	155,152	10,637,225	29,529,000	2.78	8,160	1,456	1,238	1,961	12,815	202	4.11

[1] In this county the mines have in recent times followed the practice of reducing their forces in periods of dull market and of working every day underground when the tipple worked only one, two, or three days a week. As the figures of days worked represent tipple time, the result is not comparable with the returns for other counties, and the average for the State is affected also.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

GEORGIA

County	Net tons				Value			Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
Walker	52,711	689	1,344	5,125	59,869	$173,000	$2.89	----	----	----	127	127	253	1.86

ILLINOIS

Bond, Clinton, and Marion	1,548,729	104,557	52,344	----	1,705,630	$3,156,000	$1.85	1,441	223	242	202	2,108	145	5.59
Bureau	322,369	34,774	14,965	----	372,108	1,169,000	3.14	716	65	85	71	937	179	2.22
Cass, Hancock, Scott, and Warren	----	8,329	----	----	8,329	25,000	3.00	21	2	2	3	28	183	1.62
Christian	4,096,268	176,672	38,005	----	4,310,945	9,132,000	2.12	2,566	338	368	281	3,553	182	6.68
Edgar, Logan, and Macon	165,769	217,855	10,452	----	394,076	1,249,000	3.17	459	59	90	75	683	236	2.44
Franklin	15,452,956	95,631	129,626	----	15,678,213	35,501,000	2.26	9,619	1,877	1,632	1,286	14,414	198	5.50
Fulton	1,641,316	150,077	9,321	----	1,800,714	3,737,000	2.08	1,509	191	124	295	2,119	141	6.01
Gallatin	13,322	15,426	1,865	----	30,613	71,000	2.32	134	15	22	19	190	64	2.51
Greene	----	4,785	----	----	4,785	8,000	1.67	9	----	----	----	9	141	3.77
Grundy	438,019	4,006	1,570	----	443,595	1,049,000	2.36	234	117	14	40	405	223	4.92
Henry	129,998	38,664	2,497	----	171,159	523,000	3.06	218	20	24	23	285	184	3.26
Jackson	1,723,597	50,938	9,488	----	1,784,023	3,237,000	1.81	537	119	112	256	1,024	193	9.03
Jefferson and White	80,103	4,814	9,001	----	93,918	182,000	1.94	401	88	149	79	717	47	2.82
Knox	4,777	29,435	1,400	----	35,612	96,000	2.70	52	6	5	8	71	176	2.85
La Salle	301,699	358,792	8,663	----	669,154	2,035,000	3.04	906	105	68	107	1,186	201	2.81
Livingston	----	27,190	491	----	27,681	99,000	3.58	44	2	4	6	56	179	2.76
McDonough	----	8,229	----	----	8,229	33,000	4.01	21	4	3	3	31	206	1.29
McLean, Will, and Woodford	75,265	57,372	9,766	----	142,403	489,000	3.43	320	49	12	37	418	179	1.90
Macoupin	6,081,456	69,928	122,154	----	6,273,538	12,271,000	1.96	3,206	386	1,153	292	5,037	204	6.10
Madison	3,220,101	240,596	70,151	----	3,530,848	7,040,000	1.99	2,609	411	455	278	3,753	164	5.72
Marshall	----	9,990	----	----	9,990	30,000	3.00	12	1	2	1	16	215	2.90
Menard	5,600	58,296	2,722	----	66,618	187,000	2.81	76	6	7	13	102	146	4.48
Mercer	76,012	5,868	400	----	82,280	213,000	2.59	146	23	12	19	200	127	3.25
Montgomery	1,806,003	28,921	31,395	----	1,866,319	3,787,000	2.03	1,259	239	153	123	1,774	181	5.81
Peoria	918,895	204,830	9,850	----	1,133,575	2,578,000	2.27	1,066	184	126	131	1,507	189	3.99

Perry	2,100,499	157,469	55,412		2,313,380	4,228,000	1.83	1,508	233	168	363	2,272	164	6.23
Randolph	944,115	42,968	23,131		1,010,214	2,007,000	1.99	960	158	138	106	1,362	128	5.77
Rock Island		15,707	548		16,255	54,000	3.32	37	4	5	4	50	116	2.80
St. Clair	2,886,866	455,543	72,166		3,414,575	6,372,000	1.87	3,207	488	301	765	4,761	128	5.62
Saline	4,579,000	57,826	85,624		4,722,450	10,024,000	2.12	3,973	695	463	621	5,752	166	4.94
Sangamon	5,040,623	349,725	68,276		5,458,624	11,908,000	2.18	5,851	753	595	435	7,614	160	4.47
Schuyler		11,350	1,145		12,495	26,000	2.08	17	3	3	2	25	219	2.28
Shelby	34,534	21,904	6,598		63,036	176,000	2.79	107	16	11	14	148	161	2.65
Stark		6,698			6,698	22,000	3.28	13	2	2	2	19	202	1.74
Tazewell	254,166	126,213	1,351		381,730	936,000	2.45	323	54	64	53	494	212	3.64
Vermilion	2,705,769	336,847	48,509		3,091,125	7,114,000	2.30	1,776	248	363	544	2,931	208	5.08
Wabash		5,600			5,600	14,000	2.50	10	2	1	1	14	113	3.53
Washington	91,222	73,152	4,983		169,357	373,000	2.20	389	54	104	44	591	77	3.72
Williamson	7,872,530	67,220	117,279		8,057,029	17,453,000	2.17	6,261	951	1,022	980	9,214	159	5.49
	64,611,578	3,734,197	1,021,148		[2] 69,366,923	148,604,000	2.14	51,993	8,191	8,104	7,582	75,870	172	5.31

INDIANA

Clay	1,077,306	77,033	21,830		1,176,169	$2,234,000	$1.90	356	62	48	333	799	198	7.45
Daviess	10,602	18,190	940		29,732	54,000	1.82	35	8	8	12	63	137	3.45
Fountain and Parke		4,695			4,695	13,000	2.77	7	1	1	2	11	158	2.70
Gibson	1,257,326	38,082	19,721		1,315,129	2,608,000	1.98	770	205	174	119	1,268	191	5.43
Greene	1,237,430	29,874	8,343		1,275,647	2,449,000	1.92	649	102	126	180	1,057	163	7.40
Knox	3,044,307	38,848	17,989		3,101,144	6,123,000	1.97	1,957	361	359	266	2,943	206	5.13
Owen	72,754	3,340	1,700		77,794	136,000	1.75	21	2	3	87	113	165	4.16
Perry		6,212			6,212	18,000	2.90	9	1	1	2	13	150	3.19
Pike	2,543,662	23,040	31,047		2,597,749	4,780,000	1.84	527	123	187	623	1,460	213	8.35
Spencer and Vanderburg	108,775	171,448	7,001		287,224	470,000	1.64	246	51	33	34	364	167	4.73
Sullivan	4,521,046	63,134	76,846		4,661,026	9,926,000	2.13	2,743	521	731	582	4,577	176	5.79
Vermilion	2,282,115	39,192	49,951		2,371,258	4,401,000	1.86	2,345	388	202	273	3,208	155	4.76
Vigo	4,889,084	200,337	173,167		5,262,588	11,005,000	2.09	4,531	712	735	597	6,575	155	5.17
Warrick	975,861	35,150	8,628		1,019,639	1,672,000	1.64	468	86	146	253	953	157	6.80
	22,020,268	748,575	417,163		23,186,006	45,889,000	1.98	14,664	2,623	2,754	3,363	23,404	173	5.72

[1] Washery and other refuse excluded.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

IOWA

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
Adams		6,088			6,088	$23,000	$3.78	37	1	3	2	43	125	1.13
Appanoose	425,708	52,653	2,136		480,497	1,592,000	3.31	1,671	127	127	144	2,069	114	2.03
Boone	354,434	65,882	7,066		427,382	1,402,000	3.28	565	65	121	51	802	219	2.43
Dallas	348,023	9,972	1,416		359,411	1,064,000	2.96	533	63	80	62	738	148	3.29
Davis, Jefferson, and Keokuk		4,069			4,069	13,000	3.19	19	2	3	4	28	99	1.46
Greene, Story, and Webster		9,699			9,699	24,000	2.47	25	4	5	5	39	136	1.82
Guthrie		5,591			5,591	15,000	2.68	24	1	1	1	27	125	1.66
Jasper	250	21,344	2,500		24,094	94,000	3.90	53	5	9	14	81	132	2.25
Lucas and Warren	625,350	12,690	27,730		665,770	2,026,000	3.04	555	90	165	83	893	239	3.12
Mahaska		54,551	582		55,133	147,000	2.67	108	3	7	9	127	161	2.70
Marion	878,474	33,120	14,494		926,088	2,588,000	2.79	788	100	216	86	1,190	238	3.27
Monroe	826,000	24,226	24,746		874,972	2,690,000	3.07	987	147	97	100	1,331	210	3.14
Page and Taylor	10,686	23,042	154		33,882	142,000	4.19	76	6	7	10	99	216	1.59
Polk	318,722	345,184	10,549		674,455	2,163,000	3.21	836	120	146	88	1,190	190	2.99
Van Buren	3,581	2,977	85		6,643	18,000	2.71	13	1	2	2	18	145	2.55
Wapello	665	50,743	1,100		52,508	153,000	2.91	96	8	11	8	123	161	2.64
Wayne		18,305	900		19,205	60,000	3.12	52	5	6	8	71	134	2.02
	3,791,893	740,136	93,458		4,625,487	14,214,000	3.07	6,438	748	1,006	677	8,869	183	2.85

KANSAS

Bourbon		18,954	115		19,069	$76,000	$3.99	34	2	5	6	47	105	3.87
Cherokee	934,190	99,972	14,128		1,048,290	2,570,000	2.45	587	56	37	447	1,127	151	6.16
Crawford	2,920,597	135,472	33,984		3,090,053	8,938,000	2.89	4,272	467	392	791	5,922	151	3.46
Franklin and Leavenworth	55,403	59,369	2,388		117,165	468,000	3.99	377	30	60	50	517	268	.85
Linn	41,616	11,215	380		53,211	108,000	2.03	96	7	16	16	135	152	2.58
Osage	63,065	25,558	69		88,692	375,000	4.23	334	28	31	31	424	145	1.44
	4,014,876	350,540	51,064		4,416,480	12,535,000	2.84	5,700	590	541	1,341	8,172	158	3.43

KENTUCKY

Eastern district:														
Bell	3,069,632	35,930	13,716		3,119,278	$5,208,600	$1.67	2,218	425	504	535	3,682	230	3.68
Boyd	8,000	1,657			9,657	24,000	2.49	14	1	2	3	20	226	2.14
Breathitt	111,025	91,994	4,200		207,219	332,000	1.60	189	35	59	45	328	228	2.77
Carter	72,012	47,644	35		119,691	214,000	1.79	167	20	21	35	243	167	2.95
Clay	88,219	865			89,084	163,000	1.83	169	31	23	47	270	173	1.91
Floyd	5,226,502	53,253	58,973		5,338,728	10,128,000	1.90	3,044	620	560	772	4,996	243	4.40
Harlan	12,899,525	80,011	50,325	109,175	13,139,036	25,420,000	1.93	6,543	1,579	1,071	1,473	10,666	259	4.76
Johnson	1,209,136	14,232	17,967		1,241,335	2,893,000	2.33	762	149	272	195	1,378	260	3.45
Knott	543,068	2,807			545,875	799,000	1.46	223	64	24	39	350	257	6.07
Knox	387,261	8,501	4,140		399,902	677,000	1.69	392	63	53	82	590	204	3.33
Laurel	99,089	200			99,289	166,000	1.67	181	13	40	27	261	164	2.32
Letcher	6,107,738	49,671	55,974		6,213,383	11,373,000	1.83	3,061	903	633	646	5,243	250	4.73
McCreary	950,225	18,548	3,650		972,423	1,962,000	2.02	705	139	157	131	1,132	232	3.70
Martin	643,862	750			644,612	1,082,000	1.68	222	61	48	41	372	252	6.87
Morgan	15,440	1,640	3,495		20,575	79,000	3.84	36	13	27	57	133	247	.63
Perry	6,621,065	84,366	423		6,705,854	12,230,000	1.82	3,550	637	852	970	6,009	252	4.43
Pike	7,439,758	64,204	58,991	140,777	7,703,730	13,978,000	1.81	4,027	954	1,294	1,292	7,567	235	4.32
Whitley	676,279	12,600	19,647		708,526	1,702,000	2.40	869	84	120	164	1,237	180	3.19
Other counties (Lawrence, Lee, and Magoffin)	180,099	800	1,352		182,242	306,000	1.68	87	19	20	30	156	216	5.40
	46,347,926	569,673	292,888	249,952	47,460,439	88,736,000	1.87	26,459	5,810	5,780	6,584	44,633	243	4.37
Western district:														
Daviess	37,900	74,728	475		113,103	172,000	1.51	99	11	11	15	136	253	3.29
Henderson	252,155	47,465	14,144		413,764	608,000	1.47	321	79	72	52	524	181	4.36
Hopkins	4,769,342	47,140	54,591		4,871,073	6,775,000	1.39	2,355	430	693	987	4,465	194	5.61
McLean	92,572	3,269	4,693		100,534	129,000	1.28	118	20	14	19	171	148	3.98
Muhlenberg	5,023,612	62,646	66,179		5,152,437	6,905,000	1.34	3,300	538	996	585	5,419	186	5.10
Ohio	1,101,170	10,225	13,255		1,124,650	1,484,000	1.32	851	156	116	199	1,322	185	4.60
Union	1,135,608	56,046	32,034		1,223,688	1,601,000	1.31	775	121	258	166	1,320	230	4.03
Webster	2,406,109	20,671	10,794		2,437,574	3,289,000	1.35	1,638	268	309	300	2,515	191	5.09
Other counties (Christian and Crittenden)	24,814	200	2,186		27,200	41,000	1.51	48	10	8	7	73	118	3.15
	14,943,282	322,390	198,351		15,464,023	21,004,000	1.36	9,505	1,633	2,477	2,330	15,945	192	5.04
Total, all Kentucky	61,291,208	892,063	491,239	249,952	62,924,462	109,740,000	1.74	35,964	7,443	8,257	8,914	60,578	230	4.52

MARYLAND

Allegany	2,180,694	87,280	7,400		2,275,374	$5,283,000	$2.32	1,825	293	272	340	2,730	245	3.40
Garrett	774,895	18,003	10,081		802,979	1,517,000	1.89	624	97	96	134	951	206	4.09
	2,955,589	105,283	17,481		3,078,353	6,800,000	2.21	2,449	390	368	474	3,681	235	3.56

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

MICHIGAN

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
Bay and Midland	225,327	7,210	15,720		248,257	$1,000,000	$4.03	568	97	72	69	806	127	2.42
Saginaw	404,733		33,717		438,450	1,829,000	4.17	543	85	79	60	767	217	2.63
	630,060	7,210	49,437		686,707	2,829,000	4.12	1,111	182	151	129	1,573	171	2.55

MISSOURI

Adair	174,435	10,505	6,585		191,525	$521,000	$2.72	226	33	40	23	322	201	2.96
Audrain and Ralls	18,027	7,937	60		26,024	84,000	3.23	64	7	9	9	89	146	2.01
Barton	1,121,748	4,481	16,511		1,142,740	3,158,000	2.76	218	16	10	515	759	183	[3] 8.21
Bates	232,656	5,288	4,650		242,594	509,000	2.10	121	7	12	151	291	178	4.68
Boone		26,412	330		26,742	73,000	2.73	60	7	7	9	83	141	2.28
Caldwell and Chariton	2,000	7,835	7		9,842	29,000	2.95	29	2	3	3	37	105	2.53
Callaway		35,377	17		35,394	129,000	3.64	100	9	15	28	152	196	1.19
Clay	52,881	16,253	295		69,429	267,000	3.85	158	18	26	16	218	190	1.68
Harrison and Schuyler	8,517	3,047	300		11,864	37,000	3.12	41	3	5	5	54	151	1.45
Henry	47,897	18,700	1,025		67,622	176,000	2.60	19	3	3	61	86	177	4.44
Johnson	8,997	2,881			11,878	34,000	2.86	34	2	3	5	44	122	2.22
Lafayette	304,445	46,238	8,753		359,436	1,260,000	3.51	758	61	129	72	1,020	159	2.22
Linn	6,150	25,319	375		31,844	124,000	3.89	114	13	12	14	153	160	1.30
Macon	51,128	25,565	363		77,056	239,000	3.10	163	13	27	20	223	159	2.17
Putnam	5,617	2,737			8,354	24,000	2.87	48	4	5	6	63	81	1.64
Randolph	127,004	51,696	3,108		181,808	491,000	2.70	273	24	30	30	357	219	2.32
Ray	413,377	48,800	1,215		463,392	1,662,000	3.59	937	100	81	125	1,243	174	2.14
St. Clair and Vernon	44,812	3,539	2,600		50,951	134,000	2.63				76	76	170	3.94
	2,619,691	342,610	46,194		3,008,495	8,951,000	2.98	3,363	322	417	1,168	5,270	174	3.27

[3] The output of this county is chiefly obtained from strip pits, in which the production per man per day is large.

MONTANA

Carbon	700,193	27,746	33,810		761,749	$2,404,000	$3.16	536	102	79	146	863	157	5.63
Cascade	249,121	22,700	3,867		275,688	719,000	2.61	239	47	42	69	397	162	4.29
Dawson		12,606	50		12,656	21,000	1.66	10	1	1	1	13	164	5.93
Musselshell	933,253	5,603	10,227		949,083	2,453,000	2.58	596	133	129	114	972	155	6.28
Rosebud	729,564		1,113		730,677	1,094,000	1.50				71	71	216	[1] 47.64
Sheridan		9,865			9,865	20,000	2.03	10	2	2	2	16	172	3.58
Other counties (Blaine, Fergus, Hill, Judith Basin, Pondera, Richland, and Toole)	26,808	30,734	500		58,042	172,000	2.96	54	11	8	14	87	244	2.74
	2,638,939	109,254	49,567		2,797,760	6,883,000	2.46	1,445	296	261	417	2,419	162	7.14

NEW MEXICO

Colfax	1,627,729	13,734	12,718	94,440	1,748,621	$5,077,000	$2.90	997	195	167	176	1,535	257	4.43
McKinley	740,182	21,353	23,530		785,065	2,669,000	3.40	656	150	124	160	1,070	227	3.24
San Juan		5,054			5,054	13,000	2.57	4	1	1	1	7	244	2.96
Other counties (Lincoln, Rio Arriba, Sandoval, Santa Fe, and Socorro)	254,581	11,179	13,423		279,183	1,157,000	4.14	273	47	65	170	555	282	1.79
	2,622,492	51,320	49,671	94,440	2,817,923	8,916,000	3.16	1,930	373	357	507	3,167	251	3.54

NORTH CAROLINA

Chatham and Lee	51,997	1,485	4,457		57,939	$243,000	$4.19	65	43	22	25	155	292	1.28

[1] The output of this county is obtained from strip pits, in which the production per man per day is large.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

NORTH DAKOTA (LIGNITE)

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
Adams	46,395	12,203	1,205		59,803	$113,000	$1.89	36	4	3	8	51	194	6.04
Billings, Golden Valley, and Oliver	1,197	3,644			4,841	9,000	1.86	9	1	2	1	13	86	4.35
Bowman	40,518	11,365	7,500		59,383	74,000	1.25	16	1	2	16	35	214	7.94
Burke	313,908	17,363	4,959		336,230	636,000	1.89				156	156	178	12.08
Burleigh	160,075	15,715	8,910		184,700	327,000	1.77	113	15	14	40	182	141	7.18
Divide	18,702	6,998			25,700	54,000	2.10	20	3	2	22	47	197	2.77
Dunn		4,454			4,454	10,000	2.25	6	1	1	2	10	145	3.06
Grant	7,000	7,655			14,655	27,000	1.84	34	3	4	8	49	78	3.85
Hettinger	11,878	10,279			22,157	40,000	1.81	26	2	2	6	36	153	4.03
McLean	58,371	33,874	1,969		94,214	192,000	2.04	67	8	10	74	159	126	4.69
Mercer	340,322	4,755	6,580		351,657	479,000	1.36	128	15	10	58	211	164	10.15
Morton	15,662	24,441	3,006		43,109	71,000	1.65	37	3	4	6	50	170	5.06
Mountrail		5,534			5,534	15,000	2.71	11	1	1	2	15	171	2.16
Stark	30,850	18,945	1,200		50,995	88 000	1.73	47	5	5	11	68	227	3.31
Ward	300	45,795	50		46,145	101,000	2.19	79	4	8	11	102	156	2.90
Williams	20,945	45,531	191		66,667	142.000	2.13	83	4	8	9	104	188	3.40
	1,066,123	268,551	35,570		1,370,244	2,378,000	1.74	712	70	76	430	1,288	162	6.56

OHIO

Athens	2,649,528	43,110	24,478		2,717,116	$5,190,000	$1.91	4,308	480	488	531	5,807	113	4.13
Belmont	8,395,213	530,702	46,838		8,972,753	17,316,000	1.93	8,857	1,065	1,111	1,011	12,044	159	4.70
Carroll	235,878	104,330	4,427		344,635	689,000	2.00	274	34	37	48	393	254	3.45
Columbiana	315,443	56,782	2,147		374,372	864,000	2.31	414	51	31	57	553	184	3.67
Coshocton	164,812	37,786	2,425		205,023	477,000	2.33	227	17	26	23	293	181	3.87
Guernsey	1,062,913	128,204	29,228		1,220,345	2,421,000	1.98	1,581	281	332	220	2,414	101	5.02

Harrison	2,565,620	10,296	62,558		2,638,474	4,530,000	1.72	746	115	106	941	1,908	170	8.12
Hocking	577,426	54,548	889		632,863	1,192,000	1.88	1,174	125	122	185	1,606	93	4.24
Holmes		16,141			16,141	34,000	2.11	16		1	1	18	240	3.74
Jackson	33,297	103,700	4,168		141,165	364,000	2.58	225	21	39	34	319	140	3.16
Jefferson	4,468,556	640,747	45,450		5,154,753	10,281,000	1.99	3,836	523	465	807	5,631	197	4.64
Lawrence	2,821	100,343	334		103,498	206,000	1.99	110	11	8	11	140	233	3.17
Mahoning	53	41,583	10		41,646	119,000	2.86	47	5	8	11	71	258	2.27
Medina, Portage, Summit, and Wayne	47,841	19,571	7,813		75,225	262,000	3.48	99	23	19	37	178	141	2.99
Meigs	890,548	16,899	271		907,718	1,590,000	1.75	743	94	186	133	1,156	225	3.48
Morgan and Washington	308,777	1,071			309,848	690,000	2.23	255	39	36	26	356	263	3.31
Muskingum	127,938	53,928			181,866	385,000	2.12	242	19	13	19	293	158	3.92
Noble	414,784	2,841	9,326		426,951	860,000	2.01	455	74	108	48	685	126	4.96
Perry	1,648,098	64,639	17,977		1,730,714	3,529,000	2.04	1,724	271	147	315	2,457	178	3.97
Stark	127,742	239,291	6,852		373,885	1,140,000	3.05	374	54	40	72	540	211	3.28
Tuscarawas	783,884	444,069	1,882		1,229,835	2,490,000	2.02	1,047	173	120	147	1,487	188	4.40
Vinton	49,902	21,841	1,919		73,662	130,000	1.76	141	20	19	18	198	111	3.34
	24,871,074	2,732,422	268,992		27,872,488	54,759,000	1.96	26,895	3,495	3,462	4,695	38,547	159	4.56

OKLAHOMA

Coal	81,287	1,375	790		83,452	$274,000	$3.28	82	15	13	17	127	180	3.65
Craig	522	4,530			5,052	14,000	2.77	5	1	1	7	14	110	3.28
Latimer	289,311	8,124	11,553		308,988	987,000	3.19	373	87	102	102	664	167	2.79
Le Flore	355,320	10,931	4,034		370,285	1,139,000	3.08	492	83	79	87	741	148	3.37
Okmulgee	580,741	760	3,106		584,607	1,712,000	2.93	823	171	114	121	1,229	138	3.45
Pittsburg	923,927	4,523	37,334		965,784	3,405,000	3.53	997	313	352	218	1,880	230	2.24
Tulsa	145,090	53,204	4,977		203,271	648,000	3.19	96	14	15	227	352	167	3.45
Other counties (Haskell, Muskogee, Rogers, Sequoyah, and Wagoner)	309,589	6,751	4,894		321,234	863,000	2.69	30	4	6	353	393	208	3.94
	2,685,787	90,198	66,688		2,842,673	9,042,000	3.18	2,898	688	682	1,132	5,400	183	2.88

PENNSYLVANIA (BITUMINOUS)

Allegheny	11,183,348	2,362,644	94,298		13,640,290	$29,710,000	$2.18	10,782	1,530	1,391	1,781	15,484	210	4.20
Armstrong	4,311,086	196,076	14,302		4,521,464	8,126,000	1.80	3,531	406	452	672	5,061	237	3.77
Beaver	203,136	120,340	86		323,562	710,000	2.19	216	28	13	113	370	233	3.76
Bedford	594,975	8,061	2,174		605,210	1,534,000	2.53	840	119	65	101	1,125	168	3.21
Blair and Fulton	302,232	30,382	5,360	14,814	352,788	993,000	2.81	388	48	28	34	498	225	3.14
Bradford and Lycoming	45,198	2,286	50		47,534	139,000	2.92	47	15	5	8	75	218	2.90
Butler	1,757,355	71,241	7,713		1,836,309	3,708,000	2.02	1,652	232	188	282	2,354	210	3.72
Cambria	15,976,352	2,562,062	141,276	180,955	18,860,645	44,005,000	2.33	14,713	1,940	1,781	2,132	20,566	215	4.26
Center	1,190,829	57,906	609		1,249,344	2,591,000	2.07	1,160	148	89	184	1,581	199	3.97
Clarion	1,396,170	116,022	4,517		1,516,709	2,848,000	1.88	1,598	206	112	261	2,177	201	3.47

[1] The output of this county is obtained from strip pits, in which the production per man per day is large.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

PENNSYLVANIA (BITUMINOUS)—Continued

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Underground			Surface	Total		
								Miners, loaders, and shot firers	Haulage and track	All others				
Clearfield	4,775,987	231,214	56,631	137,276	5,201,108	$11,426,000	$2.20	5,875	654	553	825	7,907	183	3.59
Clinton	244,417	19,745	5,742		269,904	435,000	1.61	159	30	15	64	268	233	4.32
Elk	760,237	20,113	33,506		813,856	1,717,000	2.11	1,164	106	74	138	1,482	182	3.02
Fayette	21,010,077	256,058	484,647	11,005,155	32,755,937	71,412,000	2.18	13,848	3,552	5,245	4,385	27,030	248	4.88
Greene	6,227,962	37,451	52,653	40,851	6,358,917	12,749,000	2.00	2,446	551	618	657	4,272	279	5.34
Huntingdon	612,894	20,805	17,031	1,001	651,731	1,819,000	2.79	758	111	65	78	1,012	223	2.89
Indiana	9,540,608	257,045	36,986	497,166	10,331,805	19,397,000	1.88	7,488	834	923	1,155	10,400	232	4.29
Jefferson	2,544,782	65,512	19,469	165,727	2,795,490	5,473,000	1.96	2,774	288	267	385	3,714	205	3.67
Lawrence	225,210	10,547	10,577		246,334	732,000	2.97	198	46	35	46	325	265	2.86
McKean and Venango	5,275	8,923			14,198	41,000	2.89	29	1	6	8	44	263	1.23
Mercer	322,077	9,714	12,856		344,647	870,000	2.52	252	64	51	54	421	259	3.16
Somerset	9,851,354	185,318	105,506		10,142,178	20,909,000	2.06	7,253	1,043	884	1,342	10,522	234	4.12
Tioga	149,622	34,609	4,528		188,759	658,000	3.49	514	61	53	108	736	105	2.44
Washington	17,227,768	484,917	83,572	85,153	17,881,410	37,742,000	2.11	13,281	2,011	1,628	2,232	19,152	207	4.51
Westmoreland	17,879,831	838,083	298,717	3,074,878	22,091,509	45,874,000	2.08	11,751	2,230	2,447	2,995	19,423	242	4.70
	128,338,782	8,007,074	1,492,806	15,202,976	153,041,638	325,618,000	2.13	102,717	16,254	16,988	20,040	155,999	224	4.37
SOUTH DAKOTA (LIGNITE)														
Corson and Harding		408			408	$1,000	$2.45	6				6	39	1.74
Dewey	2,960	2,060			5,020	13,000	2.59	13				13	172	2.25
Meade		1,537			1,537	6,000	3.90	7				7	145	1.51
Perkins		5,763			5,763	16,000	2.78	18				18	128	2.50
Ziebach	1,000	700			1,700	6,000	3.53	8				8	100	2.13
	3,960	10,468			14,428	42,000	2.91	52				52	127	2.19

TENNESSEE

Anderson	870,863	26,093	3,569	----------	900,525	$1,519,000	$1.69	811	129	100	143	1,183	226	3.37
Campbell	1,161,867	37,277	11,569	----------	1,210,713	2,448,000	2.02	1,195	215	148	250	1,808	234	2.86
Claiborne	967,022	5,674	5,100	----------	977,796	1,814,000	1.86	630	147	96	145	1,018	195	4.93
Fentress	443,090	5,451	8,562	----------	457,103	775,000	1.70	255	57	57	69	438	268	3.90
Hamilton	180,944	15,618	9,236	----------	205,798	479,000	2.33	248	52	43	70	413	248	2.01
Marion	306,514	5,098	7,065	----------	318,677	643,000	2.02	289	53	28	88	458	259	2.68
Morgan	322,228	2,491	2,080	33,269	360,068	640,000	1.78	426	76	143	73	718	265	1.89
Roane	150	1,301	3,748	144,342	149,541	383,000	2.56	96	86	45	36	263	286	1.99
Scott	131,290	9,747	3,470	----------	144,507	215,000	1.49	137	26	18	69	241	168	3.57
Other counties (Bledsoe, Cumberland, Grundy, Overton, Putnam, Rhea, Sequatchie, and White)	991,462	12,696	21,819	38,036	1,064,013	2,059,000	1.94	825	173	146	264	1,408	233	3.24
	5,375,430	121,446	76,218	215,647	5,788,741	10,975,000	1.90	4,912	1,014	824	1,198	7,948	234	3.11

TEXAS

Bituminous: Erath, Maverick, Palo Pinto, Webb, and Wise	160,086	4,633	5,775	----------	170,494	$605,000	$3.55	419	64	55	91	629	164	1.65
Lignite: Bastrop, Henderson, Hopkins, Houston, Lee, Leon, Medina, Milam, Nacogdoches, Shelby, Titus, and Wood	900,759	8,018	11,887	----------	920,664	1,146,000	1.24	688	138	50	145	1,021	214	4.22
	1,060,845	12,651	17,662	----------	1,091,158	1,751,000	1.60	1,107	202	105	236	1,650	195	3.39

UTAH

Carbon	3,816,211	24,978	40,678	203,750	4,085,617	$9,603,000	$2.35	1,909	383	306	520	3,118	193	6.78
Emery	105,236	4,844	146	----------	110,246	301,000	2.73	162	20	22	40	244	64	7.07
Summit	47,495	3,072	770	182	51,519	120,000	2.33	40	10	9	12	71	212	3.42
Uintah	----------	5,440	70	----------	5,510	22,000	3.99	11	1	1	4	17	119	2.72
Other counties (Grand, Iron, and Sevier)	110,385	4,464	6,052	----------	120,901	316,000	2.61	52	11	6	26	95	240	5.31
	4,079,347	42,798	47,716	203,932	4,373,793	10,362,000	2.37	2,174	425	344	602	3,545	186	[5] 6.65

[5] The calculated output per man per day is affected by the practice of men going into certain mines to shoot and load coal on days when the tipples and mines, as a whole, are not in operation.

TABLE 75.—*Production, value, men employed, days worked, and output per man per day at coal mines in specified States and counties in 1926*—Continued

VIRGINIA

County	Net tons					Value		Number of employees					Average number of days worked	Average tons per man per day
								Underground			Surface	Total		
	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke at mines	Total quantity	Total	Average per ton	Miners, loaders, and shot firers	Haulage and track	All others				
Dickenson	1,100,965	9,536	4,876		1,115,377	$1,912,000	$1.71	547	179	118	160	1,004	282	3.94
Lee	1,953,975	15,709	1,703		1,971,387	3,867,000	1.96	985	222	199	306	1,712	240	4.79
Montgomery, Pulaski, and Scott	252,507	13,842	5,694		272,043	1,083,000	3.98	204	44	44	122	414	254	2.58
Russell	1,836,905	24,544	2,519		1,863,968	3,294,000	1.77	890	315	229	321	1,755	268	3.97
Tazewell	2,327,708	12,352	7,492		2,347,552	5,043,000	2.15	1,313	222	452	380	2,367	249	3.98
Wise	5,909,451	45,954	30,695	576,959	6,563,059	12,004,000	1.83	3,069	985	1,550	908	6,512	269	3.74
	13,381,511	121,937	52,979	576,959	14,133,386	27,203,000	1.92	7,008	1,967	2,592	2,197	13,764	263	3.91

WASHINGTON

King	499,360	33,393	5,532	300	538,585	$1,799,000	$3.34	431	105	200	287	1,023	155	3.40
Kittitas	1,042,368	15,899	19,361		1,077,628	3,917,000	3.63	892	132	81	184	1,289	222	3.76
Lewis	35,874	14,365	2,294		52,533	133,000	2.53	101	18	13	34	166	115	2.76
Pierce	351,085	3,287	14,162	38,965	407,499	1,846,000	4.53	284	70	178	160	692	227	2.60
Other counties (Cowlitz, Thurston, and Whatcom)	482,036	19,716	8,571		510,323	1,655,000	3.24	280	45	30	84	439	212	5.50
	2,410,723	86,660	49,920	39,265	2,586,568	9,350,000	3.61	1,988	370	502	749	3,609	198	3.62

WEST VIRGINIA

Barbour	2,597,576	34,040	10,847	41,328	2,683,791	$3,910,000	$1.46	1,368	276	201	252	2,097	213	6.00
Boone	3,710,090	33,009	11,401		3,754,500	6,775,000	1.80	1,905	519	426	529	3,379	222	5.00
Braxton	360,493	28,785	4,500		393,778	621,000	1.58	238	51	65	67	421	232	4.03
Brooke	832,061	893,466	2,949		1,728,476	3,585,000	2.07	1,178	229	122	172	1,701	198	5.13
Clay	915,993	18,306	10,087		944,386	1,837,000	1.95	396	106	132	182	816	261	4.42
Fayette	12,127,051	144,173	44,039	399,576	12,714,839	27,004,000	2.12	6,950	2,046	1,601	1,752	12,349	242	4.26

Gilmer	140,783	2,936	4,952		148,671	230,000	1.55	66	26	4	32	128	266	4.39
Greenbrier	1,373,401	50,810	9,327		1,433,538	2,835,000	1.98	687	166	187	184	1,224	239	4.70
Harrison	8,282,955	394,376	3,463		8,680,794	13,404,000	1.54	4,331	1,028	778	801	6,938	227	5.51
Kanawha	7,016,870	180,171	27,245		7,224,286	12,390,000	1.72	4,228	1,027	711	945	6,911	228	4.45
Lewis	29,320	22,215	50		51,585	75,000	1.45	97	20	22	24	163	100	3.16
Lincoln	260,122	1,736	2,420		264,278	411,000	1.56	199	20	69	45	333	189	4.20
Logan	21,584,241	511,625	16,755		22,112,621	36,483,000	1.65	7,287	2,068	2,124	2,151	13,630	265	6.12
McDowell	23,364,999	184,701	152,955	229,902	23,932,557	50,111,000	2.09	8,829	3,404	3,891	4,258	20,382	251	4.68
Marion	7,711,688	177,873	82,832	30,845	8,003,238	14,188,000	1.77	3,665	967	1,186	747	6,565	262	4.65
Marshall	2,275,336	233,384	13,068		2,521,788	4,687,000	1.86	1,339	199	203	213	1,954	285	4.53
Mason	38,360	29,404	2,060		69,824	149,000	2.13	74	13	21	16	124	171	3.29
Mercer	4,211,384	36,773	3,479	69,930	4,321,566	8,869,000	2.05	1,785	561	661	854	3,861	280	4.00
Mineral	337,905	6,827	1,655		346,387	707,000	2.04	426	94	25	90	635	175	3.12
Mingo	6,406,040	43,136	9,722		6,458,898	10,772,000	1.67	2,197	690	893	891	4,671	263	5.26
Monongalia	9,142,136	122,372	304	6,613	9,271,425	15,012,000	1.62	4,236	1,013	912	899	7,060	250	5.25
Nicholas	139,831	1,519	4,449		145,799	332,000	2.28	192	37	29	64	322	156	2.91
Ohio	1,832,081	216,246	5,884		2,054,211	3,897,000	1.90	1,526	221	121	256	2,124	226	4.28
Preston	1,955,119	20,466	6,927	116,879	2,099,391	3,647,000	1.74	1,497	295	273	320	2,385	191	4.61
Raleigh	14,176,422	131,470	75,494		14,383,386	28,275,000	1.97	5,554	1,894	1,770	1,896	11,114	270	4.80
Randolph	582,688	19,734	9,241	50,773	662,436	1,103,000	1.67	385	77	56	133	651	197	5.17
Taylor	1,549,471	11,982	60		1,561,513	2,442,000	1.56	887	189	204	161	1,441	223	4.85
Tucker	1,028,593	5,097	43,475	5,571	1,082,736	2,305,000	2.13	669	155	78	101	1,003	259	4.16
Upshur	808,890	6,541	14,676	5,170	835,277	1,162,000	1.39	448	84	77	102	711	228	5.14
Webster	44,037	875	659		45,571	126,000	2.76	50	15	6	12	83	197	2.79
Wyoming	2,837,271	21,488	14,941		2,873,700	6,086,000	2.12	1,188	506	410	484	2,588	242	4.59
Other counties (Grant, Hancock, Putnam, Summers, and Wayne)	686,733	5,229	12,132		704,094	1,306,000	1.85	512	72	237	141	962	219	3.34
	138,359,940	3,590,765	602,048	956,587	143,509,340	264,736,000	1.84	64,389	18,068	17,495	18,774	118,726	247	4.90

WYOMING

Big Horn and Park		4,433			4,433	$17,000	$3.83	7	1	1	1	10	173	2.56
Carbon	472,808	6,845	16,451		496,104	1,421,000	2.86	147	32	53	62	294	222	7.60
Campbell, Converse, Johnson, and Weston	125,560	16,014	18,272		159,846	390,000	2.44	65	13	8	37	123	248	5.24
Fremont, Hot Springs, Teton, and Uinta	488,459	17,177	44,355		549,991	1,747,000	3.18	464	96	75	130	765	165	4.35
Lincoln	1,209,987	9,644	53,383		1,273,014	3,683,000	2.89	982	144	110	235	1,471	183	4.72
Sheridan	839,600	37,076	1,942		878,618	1,960,000	2.23	289	84	10	95	478	175	[6] 10.48
Sweetwater	3,065,875	29,412	54,995		3,150,282	8,609,000	2.73	1,752	323	247	399	2,721	177	6.54
	6,202,289	120,601	189,398		6,512,288	17,827,000	2.74	3,706	693	504	959	5,862	181	6.15
Grand total	526,285,997	23,601,587	5,727,852	17,751,549	573,366,985	1,183,412,000	2.06	370,292	69,544	70,988	82,823	593,647	215	4.50

[6] The large output per man is explained by the use of loading machines, with which 62 per cent of the county production in 1926 was obtained.

COAL PRODUCED AND CONSUMED IN ALASKA

A slight increase marked the production of coal in Alaska in 1926. The total output was 87,300 tons, valued at $459,000, or $5.26 per ton. In addition 35,620 tons were imported from the States and 34,254 tons from foreign countries, indicating a total consumption in the Territory of 157,174 tons. (Table 76.)

TABLE 76.—*Coal produced and consumed in Alaska, 1917–1926*

Year	Produced in Alaska, chiefly subbituminous and lignite [1]		Imported from States, chiefly bituminous coal from Washington [2] (net tons)	Imported from foreign countries, chiefly bituminous coal from British Columbia [2] (net tons)	Total coal consumed (net tons)
	Net tons	Value			
1917	54,275	$268,438	58,116	56,589	168,980
1918	75,816	413,870	51,520	37,986	165,322
1919	60,894	345,617	57,166	48,708	166,768
1920	61,111	355,668	38,128	45,264	144,503
1921	76,817	496,394	24,278	33,776	134,871
1922	79,275	430,639	28,457	34,251	141,983
1923	119,826	755,469	34,082	43,205	197,113
1924	99,663	559,980	40,161	41,980	181,804
1925	82,868	404,617	37,324	57,230	177,422
1926	87,300	459,000	35,620	34,254	157,174

[1] Compiled by the Alaska branch of the U. S. Geological Survey.
[2] Compiled from records of the Bureau of Foreign and Domestic Commerce.

CUMULATIVE PRODUCTION, BY STATES, TO 1926

TABLE 77.—*Coal produced, by States, 1914–1926, with cumulative total production from the earliest record to the end of 1926, in thousands of net tons*

State	1914	1915	1916	1917	1918	1919	1920
Alabama	15,593	14,928	18,086	20,068	19,185	15,537	16,294
Arkansas	1,836	1,652	1,995	2,143	2,227	1,429	2,103
Colorado	8,170	8,625	10,484	12,483	12,408	10,323	12,278
Georgia	166	134	174	119	67	53	50
Illinois	57,589	58,830	66,195	86,199	89,291	60,863	88,725
Indiana	16,641	17,006	20,094	26,539	30,679	20,912	29,351
Iowa	7,451	7,614	7,261	8,966	8,192	5,625	7,814
Kansas	6,861	6,824	6,881	7,185	7,562	5,225	5,926
Kentucky	20,383	21,362	25,394	27,808	31,613	30,036	35,691
Maryland	4,134	4,180	4,460	4,746	4,497	3,022	4,065
Michigan	1,283	1,156	1,180	1,375	1,465	996	1,490
Missouri	3,936	3,812	4,742	5,670	5,668	3,980	5,370
Montana	2,805	2,790	3,633	4,227	4,532	3,236	4,414
New Mexico	3,878	3,818	3,793	4,001	4,023	3,139	3,683
North Carolina					1	7	12
North Dakota	507	528	635	791	720	841	949
Ohio	18,843	22,435	34,728	40,749	45,813	35,877	45,878
Oklahoma	3,989	3,694	3,608	4,387	4,813	3,802	4,849
Oregon	52	39	43	28	13	18	21
Pennsylvania, bituminous	147,983	157,955	170,295	172,448	178,551	150,758	170,608
Tennessee	5,943	5,730	6,137	6,194	6,831	5,213	6,662
Texas	2,324	2,089	1,988	2,356	2,261	1,681	1,615
Utah	3,103	3,109	3,567	4,125	5,137	4,631	6,005
Virginia	7,960	8,123	9,708	10,087	10,290	9,327	11,379
Washington	3,065	2,429	3,039	4,010	4,082	2,990	3,757
West Virginia	71,708	77,184	86,460	86,442	89,936	79,037	89,971
Wyoming	6,475	6,554	7,911	8,576	9,439	7,220	9,630
Other States	26	24	29	68	90	82	77
Total bituminous	422,704	442,624	502,520	551,790	579,386	465,860	568,667
Pennsylvania anthracite	90,821	88,995	87,578	99,612	98,826	88,092	89,598
Grand total	513,525	531,619	590,098	651,402	678,212	553,952	658,265

TABLE 77.—*Coal produced by States, 1914–1926, with cumulative total production from the earliest record to the end of 1926, in thousands of net tons*—Continued

State	1921	1922	1923	1924	1925	1926	Total production from earliest record to end of 1926
Alabama	12,569	18,325	20,458	19,130	20,004	21,004	486,133
Arkansas	1,228	1,110	1,297	1,452	1,220	1,459	37,712
Colorado	9,123	10,020	10,346	10,444	10,311	10,617	311,014
Georgia	34	61	76	75	66	60	10,560
Illinois	69,603	58,468	79,310	68,323	66,999	69,367	1,885,189
Indiana	20,319	19,133	26,229	21,480	21,225	23,186	544,426
Iowa	4,531	4,335	5,711	5,468	4,715	4,626	268,912
Kansas	3,467	2,955	4,443	4,248	4,524	4,416	200,215
Kentucky	31,588	42,134	44,777	45,147	57,009	62,924	682,055
Maryland	1,828	1,223	2,286	2,134	2,695	3,078	218,001
Michigan	1,142	929	1,172	831	808	687	37,426
Missouri	3,551	2,925	3,403	2,481	2,694	3,008	171,409
Montana	2,734	2,572	3,148	2,905	3,044	2,798	84,238
New Mexico	2,453	3,147	2,915	2,786	2,557	2,818	84,529
North Carolina	23	78	36	57	65	58	815
North Dakota	865	1,327	1,385	1,260	1,325	1,370	17,866
Ohio	31,943	26,934	40,547	30,473	28,034	27,873	1,112,824
Oklahoma	3,363	2,803	2,885	2,330	2,326	2,843	105,164
Oregon	(1)	(1)	(1)	(1)	(1)	(1)	[2] 2,380
Pennsylvania, bituminous	116,014	113,148	171,880	130,634	136,928	153,042	4,702,189
Tennessee	4,460	4,877	6,040	4,557	5,454	5,789	197,639
Texas	973	1,106	1,187	1,147	1,008	1,091	47,475
Utah	4,079	4,992	4,720	4,488	4,690	4,374	91,274
Virginia	7,492	10,491	11,762	10,666	12,800	14,133	230,531
Washington	2,429	2,581	2,927	2,654	2,538	2,587	103,546
West Virginia	72,787	80,488	107,900	101,663	122,381	143,509	1,996,954
Wyoming	7,261	5,972	7,575	6,757	6,553	6,512	215,116
Other States	123	114	150	129	110	121	45,284
Total bituminous	415,922	422,268	564,565	483,686	520,053	573,367	13,910,876
Pennsylvania anthracite	90,473	54,683	93,339	87,927	61,817	84,437	3,562,896
Grand total	506,395	476,951	657,904	571,613	581,870	657,804	17,473,772

[1] Included under "Other States." [2] Total through 1920.

DETAILED STATISTICS OF PENNSYLVANIA ANTHRACITE

FUELS USED IN PLACE OF ANTHRACITE DURING THE STRIKE OF 1925–26

With the figures for both 1925 and 1926 at hand it is now possible to indicate the extent of the deficit in supply caused by the great suspension and the approximate amounts of other fuels used in place of anthracite. For the purposes of this comparison, all quantities will be expressed in net tons.

Amount of deficit in supply of anthracite.—The normal production of the anthracite collieries from September 1 to February 18, the period of the strike, is about 41,000,000 net tons. At first thought it would appear that this total would have to be replaced ton for ton, by substitutes, deducting only such colliery fuel as might not be required while the mines were idle. On second thought, however, it is clear that much of the demand during that period was supplied out of stocks of anthracite on hand when the strike began. The producers had some millions of tons in their storage yards, located chiefly at points outside the anthracite region, and these were cleaned out before the strike ended. In addition there were large stocks tc be drawn upon in the yards of retail coal dealers. It is known that in Massachusetts alone there were 967,040 tons of anthracite in the hands

of retailers on September 1,[43] and over the country as a whole the total in retail yards amounted to at least 6,000,000 tons. By the end of the strike this had been reduced to a small tonnage of the steam sizes. The territory served by the dock operators at the head of Lakes Superior and Michigan as usual had received most of its winter's supply by September 1, and there were 974,473 tons in reserve on the docks which could be drawn upon to meet the deficit. Finally, there was the coal in the cellars of householders, which has never been measured, but doubtless aggregated several million tons. All these primary and secondary reserves of anthracite were thrown into the gap, acting to reduce the quantity of supplementary fuels required.

Thus, when the production of the two years 1925 and 1926 is considered as a whole and compared with the normal rate as indicated by 1924, the actual shortage in commercial tonnage is found to be much less than 41,000,000. In 1924, a year of peace and steady demand, the commercial production of anthracite—shipments plus local sales, not including colliery fuel—had been 80,291,000 net tons. Had this rate been continued the commercial production for the two years 1925 and 1926 would have totaled 160,582,000 tons. Actually it was only 134,659,000 tons. The difference of 25,923,000 tons indicates the quantity that had to be replaced by other fuels. Some of the replacement, however, was arranged by the people of Canada, for there was a net decrease of about 825,000 tons in our exports to the Dominion, leaving in round numbers 25,000,000 net tons to be replaced in the United States.

Fuel briquets and foreign anthracite.—The quantities of other fuels used in place of anthracite, calculated in the same way, are shown in the following summary (Table 1A) details being appended in a subsequent table. (Table 2A.) First of all the sales of American fuel briquets increased. In 1925 producers of fuel briquets sold 839,000 tons and in 1926 over 995,000 tons. Many of these sales went to regular customers who were already in the habit of using briquets, but in both years there was a large increase over the 580,000 tons sold in 1924. This increase, which amounts to 674,000 tons for the two years, may be counted as replacing anthracite. In addition there were imports of briquets from England and Germany, totaling 130,000 tons, as against only 38 tons in 1924. Then there were extraordinary imports of foreign anthracite, chiefly from Wales, which brought a measure of relief to the coastal cities. The increase in these imports may be put at 961,000 tons.

Coke and gas.—There was a very large increase in sales of coke for domestic heating. American producers reported an excess of 3,516,000 tons of by-product coke and 499,000 tons of beehive coke above their normal sales. Imports of foreign coke increased by 320,000 tons. Sales of gas-house coke increased by about 500,000 tons. Petroleum coke also was doubtless used instead of anthracite by some householders, but no record of the quantity is available. Moreover, the record does not show the consumption of manufactured gas in portable heaters or in special installations in the cellars of the well-to-do, although this can hardly have been a material item in meeting the deficit caused by the strike.

Raw bituminous coal.—The fuel most widely employed to replace anthracite was raw bituminous coal, and the best measure of the

[43] Report of Massachusetts Special Commission on the Necessaries of Life.

quantity used for this purpose is the increase in the sales of retailers during the strike as compared with their normal sales. A group of 850 representative dealers have been reporting their stocks, receipts, and deliveries to the bureau in the periodic surveys of coal stocks. It was found that between September 1, 1925, and April 1, 1926, these dealers delivered 33 per cent more bituminous coal than in the corresponding months of previous years. From this and from the proportion of the total retail trade which these dealers handle it appears that the increased sales of bituminous coal by all retailers in anthracite territory during the period of the strike were approximately 17,000,000 tons, including coal used to replace both steam and domestic sizes of anthracite. The substitution of bituminous coal was assisted by the action of the Interstate Commerce Commission in directing the establishment of special all-rail rates on prepared sizes shipped from the southern fields to New England and the Middle Atlantic States. The requirements of antismoke ordinances were relaxed. Producers of "smokeless" bituminous opened demonstration stations in the territory affected by the strike and gave instructions on the proper methods of using it. Thousands of consumers learned that, with care, other fuels can be burned safely in stoves and furnaces designed primarily for anthracite.

Oil.—Much publicity has been given to oil as a competitor of anthracite. A survey has just been completed by A. T. Coumbe, of the Bureau of Mines, showing the quantity of oil of all grades used for heating houses. The survey shows a consumption of 2,800,000 barrels in the burning season of 1923–24. In the season of 1924–25 consumption rose to 5,600,000 barrels and in 1925–26 to 8,800,000 barrels, while in the 1926–27 season it was approximately the same as in 1925–26. The increase in the calendar years 1925 and 1926 over what would have been consumed had the rate in 1924 been continued may be put down at 7,900,000 barrels, equivalent to 2,000,000 tons of coal. As much of the oil was used in Kansas City, St. Louis, Chicago, and other cities where bituminous coal had been the chief fuel, it is clear that not all the coal displaced by domestic oil burners has been anthracite.

In addition to the oil used by householders considerable quantities are consumed for heating other buildings. A study by Swanson [44] shows that the total used by apartments, hotels, schools, hospitals, and office buildings was 14,266,000 barrels in 1926.

Comparable data, partly estimated, show 12,100,000 barrels in 1925. Thus 1926 exceeded 1925 by some 2,166,000 barrels, and market conditions indicate that 1925 also exceeded 1924. As there are no statistics for the earlier years, it is impossible to state just how large the increase in consumption for this purpose during the period of the anthracite strike may have been. It may be noted, however, that the total consumption of 14,266,000 barrels in 1926 was equivalent to only 3,800,000 tons of coal, and that by no means all of this represented displacement of anthracite. Some of the buildings included in Swanson's study, particularly on the Pacific coast, have always burned oil, and many of the others probably used bituminous coal, which is widely employed in large buildings even in communities where householders prefer anthracite.

[44] Swanson, E. B., National Survey of Fuel-Oil Distribution, 1926: A report of the U. S. Bureau of Mines in cooperation with the American Petroleum Institute, p. 9.

These figures show that the increased use of fuel oil was undoubtedly a factor in meeting the deficit in anthracite caused by the strike, but that in proportion to the total deficit it was a relatively small factor. The net increase over the rate in 1924 for both large and small buildings can hardly have replaced more than 3,500,000 tons of anthracite and probably less. The cost of installation and the time required to manufacture the burners limited the amount of relief obtainable from oil during the crisis itself. The real effect of the suspension is felt in the continuing use of oil long after the shortage of anthracite has been overcome.

Total of all replacement fuels.—The grand total accounted for in the table is 27,100,000 net tons of substitutes as against the computed deficit of 25,000,000 net tons of anthracite. The total is still somewhat short of the quantity of replacements necessary, because householders accustomed only to anthracite would generally require more than 1 ton of another fuel to replace 1 ton of anthracite.

TABLE 1A.—*Summary of available information on fuels used in place of anthracite in the United States in 1925–26, the years of the suspension of mining*

[The figures show only the increase over the normal consumption of the other fuels as indicated by the rate in 1924, which increase presumably went to replace anthracite]

Fuel	Increase in the calendar years 1925 and 1926 over two years' sales at the 1924 rate (net tons)	Fuel	Increase in the calendar years 1925 and 1926 over two years' sales at the 1924 rate (net tons)
Fuel briquets, American production	674,000	Fuel oil expressed in tons of anthracite replaced, not more than	3,500,000
Fuel briquets, imports	130,000	Raw bituminous coal delivered by retail dealers, about	17,000,000
European anthracite, imports	961,000		27,100,000
Coke sold for domestic use:			
By-product	3,516,000		
Beehive	499,000		
Coke imports	320,000		
Sales of gas-house coke, partly estimated	500,000		

TABLE 2A.—*Commercial production of anthracite and total supplies of certain fuels used to replace anthracite, 1924–1926*

[The table does not include raw bituminous coal, data for which are not available in comparable form. It is known, however, that deliveries of bituminous coal made by retailers in anthracite territory to their customers between Sept. 1, 1925, and Apr. 1, 1926, were 15,000,000 to 21,000,000 tons greater than the corresponding months in other recent years]

	1924	1925	1926
SOLID FUELS (NET TONS)			
Anthracite commercial production (shipments and local sales)	80,291,438	56,652,949	78,006,231
Anthracite exported	4,017,785	3,179,006	4,029,683
Anthracite imported, chiefly from United Kingdom	117,951	382,894	835,056
Fuel briquets produced	580,470	839,370	995,332
Fuel briquets imported	38	6,758	123,593
By-product coke sold for domestic use	2,812,771	4,085,068	5,059,568
Beehive coke sold for domestic use	139,886	392,698	386,045
Coke imported	82,833	204,479	284,548
Gas-house coke sold [1]	[2] 2,174,518	2,398,391	No data.
Petroleum coke produced [3]	761,100	991,000	995,300
OIL (BARRELS)			
Oil used for heating houses [4]	2,800,000	5,000,000	8,800,000
Oil used for heating offices, hotels, apartments, schools, hospitals and buildings other than houses	No data.	[5] 12,100,000	14,266,000

[1] The figures include a small amount of by-product coke sold by city gas plants operating by-product coke ovens.

[2] Figures represent 1923. In 1921 the sales amounted to 2,031,239 tons.

[3] How much of the petroleum coke produced was used for household fuel is not known. It is known that 314,000 tons in 1925 and 408,000 tons in 1926 were used as refinery fuel.

[4] Figures relate to heating seasons rather than calendar years, as follows: 2,800,000 barrels in season of 1923–24; 5,000,000 in season of 1924–25; 8,800,000 in season of 1925–26; and 8,800,000 again in season of 1926–27.

[5] Data were available in a form comparable with 1926 for the Atlantic and Pacific Coast States, which consume 69 per cent of the total. An estimate for the remainder of the country has been included.

Effects of substitutes campaign.—The effect of the movement to provide competitive fuels may be read in the course of retail prices, shown in the following table (Table 3A). In Boston, for example, where the supply of other fuels was especially well organized, retail prices of anthracite advanced less than in New York. The movement was essentially local and spontaneous, and its success probably surprised even its sponsors. It was a tribute to the energy of the railroads, the distributors, and the retailers, and to the organizing ability of the local authorities and the prudence of consumers.

Anthracite Coal Service.—Not the least share of the credit belongs to the anthracite producers themselves for encouraging their retail distributors to handle other fuels as long as anthracite was not available and for instructing both dealers and consumers in the proper methods of burning substitutes. The following is abstracted from a report by the Anthracite Coal Service, an agency of the anthracite operators' conference designed to assist consumers of anthracite:

On October 29, 1925, in accordance with the policy which had been adopted by the anthracite operators' conference, Mr. D. * * * who was then our Boston representative, was authorized to aid the coal merchants and the consumers of fuel in New England in obtaining in so far as possible satisfaction from the use of competitive fuels during the cessation of anthracite mining. To this end Mr. D. immediately advised the coal merchants of Boston concerning this program and offered the services of our office in this connection. These services were immediately accepted, and Mr. D. instructed the coal merchants at their various meetings concerning the proper method of burning substitute fuel during the anthracite shortage.

In addition to the meetings, Mr. D. also worked with the various dealers individually to aid them in solving the problems of their consumers in burning competitive fuel, due to the shortage of anthracite.

After the resumption of mining the Anthracite Coal Service extended and continued its activities. It maintained headquarters in Philadelphia and branches in seven other cities from Boston to Washington. The advantages of the small sizes of anthracite as industrial fuel or as domestic fuel in low-pressure heating systems were demonstrated, and engineering advice was given to individual users on the most economical sizes to buy and the best methods of burning.

Partly because of these and other merchandising efforts, chiefly no doubt because of its unique advantages as a domestic coal, anthracite promptly recovered the vast majority of its former customers. The great suspension, however, was not without its long-time effects. Still other customers continued to use oil or competitive solid fuels, either alone or in combination with anthracite. How extensive and how nearly permanent were these losses of trade remains to be seen.

TABLE 3A.—*Average retail prices of stove anthracite and of bituminous coal in representative cities, by months, 1924–1926, as reported by the Bureau of Labor Statistics*

[From Monthly Labor Review. All figures in net tons of 2,000 pounds except as noted. Prices represent sidewalk delivery. Grades of bituminous coal were not specified]

Month	Anthracite, white-ash stove				Bituminous coal		
	Baltimore [1]	Boston	New York	Chicago	Chicago	Detroit	Norfolk
1924							
January	$16.75	$16.00	$14.42	$17.00	$8.69	$9.48	$8.83
February	16.75	15.30	14.38	17.00	8.73	9.63	8.97
March	16.75	15.50	14.33	16.75	8.56	9.52	9.00
April	15.50	15.50	13.50	16.08	8.06	9.45	8.97
May	15.50	15.50	13.57	16.08	7.85	9.32	8.22
June	15.50	15.50	13.63	16.25	7.85	9.14	8.22
July	15.79	15.70	13.70	16.25	7.85	9.18	8.25
August	15.75	15.75	13.78	16.50	7.85	9.07	8.28
September	16.29	16.00	14.13	16.50	7.83	9.07	9.00
October	16.29	16.00	14.13	16.75	8.21	9.21	9.00
November	16.25	16.00	14.13	16.75	8.13	9.25	9.00
December	16.25	16.00	14.33	16.75	8.14	9.07	9.25
1925							
January	16.25	16.00	14.33	16.74	8.51	8.93	9.27
February	16.25	16.00	14.42	16.74	8.50	8.96	9.27
March	16.25	16.00	14.42	16.70	8.48	8.83	9.27
April	15.50	15.75	14.00	16.70	8.41	8.77	9.27
May	15.50	15.75	14.02	16.10	8.06	8.70	8.57
June	15.75	15.75	14.12	16.30	8.23	8.70	8.52
July	15.75	16.00	14.22	16.30	8.21	8.79	8.48
August	16.00	16.00	14.37	16.36	8.32	8.89	8.52
September	16.00	16.25	15.13	16.77	8.89	9.73	9.05
October	16.21	16.25	17.04	17.19	8.99	9.86	9.05
November	[2]	17.00	20.50	18.13	9.65	10.59	10.43
December	[2]	17.80	[2]	18.13	9.49	10.70	10.52
1926							
January	[2]	[2]	[2]	[2]	9.48	10.59	10.52
February	[2]	[2]	[2]	[2]	9.34	10.53	10.52
March	16.75	18.00	15.71	16.89	8.99	10.69	10.16
April	16.00	16.00	14.75	16.86	8.39	10.45	9.34
May	16.00	16.00	14.75	16.84	8.12	9.33	8.46
June	16.00	16.00	14.75	16.84	8.13	9.24	8.41
July	16.00	16.25	14.75	16.88	8.27	9.30	8.52
August	16.00	16.25	14.75	16.88	8.32	9.25	8.52
September	16.00	16.25	14.75	16.90	8.91	9.90	9.09
October	16.08	16.40	14.75	16.91	9.06	10.39	9.66
November	16.00	16.50	14.75	17.00	10.15	11.61	10.39
December	16.00	16.50	14.75	17.00	10.34	11.05	10.25

[1] Per gross ton.

[2] Insufficient data.

PRODUCTION IN THE LEHIGH, SCHUYLKILL, AND WYOMING REGIONS

The total production of Pennsylvania anthracite in 1926, including colliery fuel and local sales and dredge and washery coal, was 75,390,582 gross tons, and the total value at the mines was $474,164,252. The tonnage was almost identical with that of 1912, also a year of wage negotiations and suspension of mining, but the value was two and one-half times that of 1912, reflecting increases in costs and prices.

At this point it should be noted that the value for 1926 is not exactly comparable with that for earlier years because of a change made in estimating the value of the production of one large company in the Wyoming region which has reported its tonnage but not its value. The method used in 1926 yields a more accurate result than that formerly employed. Had the former method been used the total value would have been $470,177,000. The methods of estimate and the corresponding effects on the total and average values are fully explained in connection with Table 18A. The change, although slight, should also be kept in mind when other tables relating to values are considered.

The following table shows the trend of production and value in recent years:

TABLE 4A.—*Total quantity and total value of anthracite produced, 1917–1926*

Year	Gross tons	Value	Year	Gross tons	Value
1917	88,939,117	$283,650,723	1922	48,824,127	$273,700,125
1918	88,237,575	336,480,347	1923	83,338,401	506,786,768
1919	78,653,751	364,926,950	1924	78,506,127	477,230,852
1920	79,998,437	434,252,198	1925	55,193,883	327,664,512
1921	80,779,867	452,304,903	1926	75,390,582	474,164,252

Of the total production, 67,248,946 tons consisted of shipments and 2,399,474 tons of local sales made within the anthracite region or in the vicinity of the river dredges and the mines of Sullivan County. The sum of the two items—69,648,420 gross tons—constitutes the "commercial production." In 1926 it brought a gross revenue of $466,420,464, or $6.70 per ton.[45] The colliery fuel, of which 5,742,162 tons was used in 1926, is a source of expense to the operator, since he must pay the mine workers for all coal produced. Its value for cost-keeping purposes in 1926 is placed at $7,743,788.

Analyzing the production by regions, it is seen that 247,918 tons was produced in the Bernice Basin, Sullivan County, a detached outlier of the coal-bearing series lying north and west of the Wyoming region in which the coal is less completely devolatilized. The Lehigh region produced 10,321,691 tons; the Schuylkill region, 22,061,822; and the Wyoming region, 42,759,151 tons.

[45] Had the same method of computation been used as in earlier years the average would have been $6.64

TABLE 5A.—*Anthracite produced, by regions, 1925–26*

Region	Shipments		Local sales		Colliery fuel		Total	
	Gross tons	Value [1]	Gross tons	Value	Gross tons	Value	Gross tons	Value [1]
1925								
Lehigh:								
Breaker product	6,455,632	$41,321,141	428,810	$1,926,225	573,897	$899,320	7,458,339	$44,146,686
Washery product	174,487	507,480					174,487	507,480
Dredge product	88,941	86,983					88,941	86,983
	6,719,060	41,915,604	428,810	1,926,225	573,897	899,320	7,721,767	44,741,149
Schuylkill:								
Breaker product	13,207,506	81,977,570	555,808	3,380,797	1,958,965	816,971	15,722,219	86,175,338
Washery product	380,747	1,041,965	2	13	7,788	3,743	388,537	1,045,721
Dredge product	366,242	382,269	371,817	384,990	1,870	3,275	739,929	770,534
	13,954,495	83,401,804	927,627	3,765,800	1,968,563	823,989	16,850,685	87,991,593
Wyoming:								
Breaker product	26,847,626	183,357,027	1,200,184	7,289,523	2,009,183	2,257,227	30,056,993	192,903,777
Washery product	317,042	1,263,233	320	1,600	41,890	49,011	359,252	1,313,844
Dredge product	64,593	67,823	13,419	3,952			78,012	71,775
	27,229,261	184,688,083	1,213,923	7,295,075	2,051,073	2,306,238	30,494,257	194,289,396
Sullivan county: Breaker product	104,659	574,233	5,155	35,731	17,360	32,410	127,174	642,374
Total breaker product	46,615,423	307,229,971	2,189,957	12,632,276	4,559,345	4,005,928	[2] 53,364,725	323,868,175
Total washery product	872,276	2,812,678	322	1,613	49,678	52,754	922,276	2,867,045
Total dredge product	519,776	537,075	385,236	388,942	1,870	3,275	906,882	929,292
Grand total	48,007,475	310,579,724	2,575,515	13,022,831	4,610,893	4,061,957	55,193,883	327,664,512
1926								
Lehigh:								
Breaker product	9,381,991	58,978,535	253,283	1,419,655	616,684	1,441,264	10,251,958	61,839,454
Washery product	16,941	114,987	52	290	468	1,034	17,461	116,311
Dredge product			52,272	61,743			52,272	61,743
	9,398,932	59,093,522	305,607	1,481,688	617,152	1,442,298	10,321,691	62,017,508

Schuylkill:								
Breaker product	18,149,497	119,592,981	538,745	3,334,170	2,145,598	1,952,545	20,833,840	124,879,696
Washery product	444,064	1,501,716	3,470	2,550	32,084	61,663	479,618	1,565,929
Dredge product	341,410	324,533	401,674	418,457	5,280	10,719	748,364	753,709
	18,934,971	121,419,230	943,889	3,755,177	2,182,962	2,024,927	22,061,822	127,199,334
Wyoming:								
Breaker product	38,088,744	270,248,192	1,153,029	6,599,679	2,820,431	4,112,659	42,042,204	280,960,530
Washery product	606,805	2,547,746	8,407	4,848	85,617	124,904	700,829	2,677,498
Dredge product	13,537	10,830	2,581	2,116			16,118	12,946
	38,709,086	272,806,768	1,144,017	6,606,643	2,906,048	4,237,563	42,759,151	[3] 283,650,974
Sullivan county: Breaker product	295,937	1,215,366	5,961	42,070	36,009	39,000	247,918	1,296,436
Total breaker product	65,826,189	450,035,074	1,931,018	11,395,574	5,618,713	7,545,468	[2] 73,375,920	468,976,116
Total washery product	1,067,810	4,164,449	11,929	7,688	118,169	187,601	1,197,908	4,359,738
Total dredge product	354,947	335,363	456,527	482,316	5,280	10,719	816,754	828,398
Grand total	67,248,946	454,534,886	2,399,474	11,885,578	5,742,162	7,743,788	75,390,582	[3] 474,164,252

[1] Value given for shipments is value at which coal left possession of producing company f. o. b. mines and does not include margins of separately incorporated selling companies.
[2] Includes about 927,000 tons of culm-bank coal put through the breakers in 1925 and 1,536,000 tons in 1926.
[3] The figures of value for 1926 are not exactly comparable with those for 1925 because of a change in method of estimating the value for a large company in the Wyoming region which has reported its tonnage but not its value. The change has the effect of raising the value about $3,987,000 above what it would have been had the same method been used as in 1925.

Much interest is attached by the anthracite industry to the comparative tonnages of the three principal regions. By limiting the comparison to the shipments and excluding Sullivan County, as is done in the following table, the relative importance of the regions may be shown back to the early days of the industry. Mining began in the Wyoming and then in the Lehigh regions, but from about 1830 up to the Civil War the Schuylkill region was the largest producer. Thereafter the Wyoming region gained rapidly and since 1885 has supplied 50 per cent or more of the shipments. In 1926 it contributed 57.7 per cent against 14.0 per cent for the Lehigh and 28.3 per cent for the Schuylkill region.

TABLE 6A.—*Anthracite shipped from the Lehigh, Schuylkill, and Wyoming regions, 1921–1926*

[Detailed figures for 1807 and each year of the period 1820 to 1924 will be found in Coal in 1924, pp. 570–571. Beginning with 1914 the figures in this series include dredge shipments. Note, however, that Sullivan County is not included, because no record of it is available prior to 1890]

Year	Lehigh region		Schuylkill region		Wyoming region		Total (gross tons)
	Gross tons	Percentage	Gross tons	Percentage	Gross tons	Percentage	
1921	9,357,245	13.5	20,058,168	28.9	39,901,464	57.6	69,316,877
1922	5,666,833	13.9	13,007,033	31.8	22,189,493	54.3	40,863,359
1923	10,154,616	13.9	22,214,576	30.4	40,777,698	55.7	73,146,890
1924	9,288,543	13.5	19,607,200	28.5	39,917,803	58.0	68,813,546
1925	6,719,060	14.0	13,954,495	29.1	27,229,261	56.9	47,902,816
1926	9,398,932	14.0	18,934,971	28.3	38,709,086	57.7	67,042,989

PRODUCTION BY FIELDS AND COUNTIES

The classification by trade regions—Lehigh, Schuylkill, and Wyoming—is the one most commonly used by the trade. It is paralleled by the organization of the United Mine Workers, in which District No. 1 corresponds to the Wyoming trade region, District No. 7 to the Lehigh region, and District No. 9 to the Schuylkill region. In studies of costs of production and reserves, however, a classification adopted by geologists is the more useful because it corresponds more closely to the natural conditions which largely govern mining costs. The geologic classification recognizes four fields—the Northern, Eastern Middle, Western Middle, and Southern. The Northern field is identical with the Wyoming region. That part of the Southern field lying east of Tamaqua, known as the Panther Creek Valley, together with the Eastern Middle field, make up the Lehigh region. That part of the Southern field west of Tamaqua and the Western Middle field are together equivalent to the Schuylkill region. The Bernice Basin in Sullivan County is sometimes grouped with the Northern field.

The natural conditions of mining are least difficult in the Northern and Eastern Middle fields, where the beds are less faulted and folded and therefore much less steeply inclined than in the Western Middle and Southern fields. These differences affect the cost of mining. In the Northern and Eastern Middle fields the output per man has in the past been relatively high and the cost therefore relatively low. These advantages, however, have so stimulated production that the

easily accessible coal has largely been extracted in many of the collieries in these areas. Exhaustion of the virgin coal and the necessity of resorting to second or even third mining has offset the natural advantages, and to-day the average output per man differs but little from that in the Western Middle and Southern fields, where the natural handicaps are more severe.

Natural conditions also affect the value of the product. In the Northern and Eastern Middle fields the yield of the profitable domestic sizes is high. In the Western Middle and particularly the Southern field it is low because of crushing of the coal by the faulting and folding of the beds. The joint effect of the geologic conditions and relative exhaustion of the workings is shown by the following statement covering operations in 1926.

Field	Gross tons of deep-mined coal produced per man underground per day [1]	Per cent of domestic sizes in breaker shipments
Northern	2.20	76.9
Eastern Middle	2.34	71.3
Western Middle	2.30	70.2
Southern	2.42	60.2
Average	2.25	72.8

[1] Excluding culm-bank and strip-pit coal. In 1925 the corresponding figures were: Northern, 2.29; Eastern Middle, 2.39; Western Middle, 2.32; and Southern, 2.49.

It will be seen that a day's labor in the Southern field will produce a much smaller quantity of the domestic sizes upon which the industry depends for profit. The bulk of the unmined coal, however, lies in the Southern and Western Middle fields.

Table 7A gives details of production in each field from 1917 to 1926.

In Table 8A production and value are given by counties for those who may be interested in segregation of the data according to local political units.

TABLE 7A.—*Anthracite produced, by fields, 1917–1926, in gross tons*

[The figures of breaker product include a certain quantity of culm-bank coal, which in 1926 amounted to about 1,536,000 tons]

Year	Northern field [1]				Eastern Middle field			Western Middle field			
	Breakers	Washeries	Dredges	Total	Breakers	Washeries	Total	Breakers	Washeries	Dredges	Total
1917	46,201,000	3,432,000	3,000	49,636,000	7,576,000	85,000	7,661,000	17,821,000	1,074,000	44,000	18,939,000
1918	45,213,000	3,529,000	3,000	48,745,000	7,631,000	112,000	7,743,000	17,289,000	1,486,000	102,000	18,877,000
1919	41,650,000	1,801,000	18,000	43,469,000	7,284,000	288,000	7,572,000	14,983,000	871,000	247,000	16,101,000
1920	40,398,000	2,939,000	29,000	43,366,000	7,010,000	115,000	7,125,000	16,123,000	942,000	240,000	17,305,000
1921	44,629,000	920,000	35,000	45,584,000	6,862,000	78,000	6,940,000	16,674,000	319,000	199,000	17,192,000
1922	24,971,000	1,032,000	48,000	26,051,000	4,121,000	36,000	4,157,000	9,651,000	995,000	194,000	10,840,000
1923	43,804,000	1,859,000	28,000	45,691,000	7,039,000	122,000	7,161,000	16,548,000	1,019,000	194,000	17,761,000
1924	44,071,000	552,000	14,000	44,637,000	6,808,000	6,000	6,814,000	15,136,000	423,000	204,000	15,763,000
1925	30,184,000	359,000	78,000	30,621,000	4,909,000		4,909,000	10,633,000	334,000	248,000	11,215,000
1926	42,290,000	701,000	16,000	43,007,000	6,446,000	18,000	6,464,000	14,483,000	441,000	255,000	15,179,000

Year	Southern field				Total			
	Breakers	Washeries	Dredges	Total	Breakers	Washeries	Dredges	Total
1917	10,961,000	1,637,000	105,000	12,703,000	82,559,000	6,228,000	152,000	88,939,000
1918	10,369,000	2,356,000	148,000	12,873,000	80,502,000	7,483,000	253,000	88,238,000
1919	10,245,000	913,000	354,000	11,512,000	74,162,000	3,873,000	619,000	78,654,000
1920	10,137,000	1,673,000	392,000	12,202,000	73,668,000	5,669,000	661,000	79,998,000
1921	10,341,000	400,000	323,000	11,064,000	78,507,000	1,717,000	556,000	80,780,000
1922	6,331,000	880,000	565,000	7,776,000	45,074,000	2,943,000	807,000	48,824,000
1923	11,077,000	1,016,000	632,000	12,725,000	78,468,000	4,016,000	854,000	83,338,000
1924	10,654,000	119,000	519,000	11,292,000	76,669,000	1,100,000	737,000	78,506,000
1925	7,639,000	229,000	581,000	8,449,000	53,365,000	922,000	907,000	55,194,000
1926	10,157,000	38,000	546,000	10,741,000	73,376,000	1,198,000	817,000	75,391,000

[1] Includes Sullivan County, which in 1926 contributed 248,000 tons.

TABLE 8A.—*Anthracite produced, by counties, 1925–26*

County	Shipments		Local sales		Colliery fuel		Total	
	Gross tons	Value[1]	Gross tons	Value	Gross tons	Value	Gross tons	Value[1]
1925								
Berks[2]	20,000	$16,000	44,000	$80,000			64,000	$96,000
Carbon	1,554,000	9,169,000	45,000	274,000	110,000	$262,000	1,709,000	9,645,000
Columbia	294,000	1,752,000	24,000	63,000	50,000	53,000	368,000	1,868,000
Dauphin	597,000	3,533,000	288,000	407,000	82,000	35,000	967,000	3,975,000
Lackawanna	11,169,000	73,977,000	415,000	2,701,000	654,000	763,000	12,238,000	77,441,000
Luzerne	18,904,000	130,189,000	1,145,000	6,018,000	1,705,000	1,922,000	21,754,000	138,129,000
Northumberland	3,883,000	22,618,000	186,000	1,051,000	505,000	216,000	4,574,000	23,885,000
Schuylkill	11,031,000	66,885,000	402,000	2,343,000	1,474,000	763,000	12,907,000	69,991,000
Sullivan	105,000	574,000	5,000	36,000	17,000	32,000	127,000	642,000
Cumberland,[3] Lancaster,[3] and York [3]	92,000	114,000	13,000	7,000			105,000	121,000
Montour,[4] Northampton,[3] and Wayne	358,000	1,813,000	9,000	43,000	14,000	16,000	381,000	1,872,000
	48,007,000	310,580,000	2,576,000	13,023,000	4,611,000	4,062,000	55,194,000	327,665,000
1926								
Berks[2]	11,000	18,000	23,000	49,000			34,000	67,000
Carbon	2,189,000	12,783,000	39,000	240,000	72,000	241,000	2,300,000	13,264,000
Columbia	560,000	3,449,000	25,000	86,000	74,000	140,000	659,000	3,675,000
Dauphin	798,000	5,066,000	365,000	440,000	97,000	188,000	1,260,000	5,694,000
Lackawanna	15,670,000	108,800,000	360,000	2,247,000	916,000	1,440,000	16,946,000	[3] 112,487,000
Luzerne	26,639,000	188,751,000	959,000	5,290,000	2,345,000	3,621,000	29,943,000	[3] 197,662,000
Northumberland	4,978,000	31,737,000	156,000	908,000	537,000	523,000	5,671,000	33,168,000
Schuylkill	15,432,000	98,184,000	417,000	2,393,000	1,615,000	1,478,000	17,464,000	102,055,000
Sullivan	206,000	1,215,000	6,000	42,000	36,000	39,000	248,000	1,296,000
Cumberland,[3] Lancaster,[3] and York [3]	72,000	82,000	43,000	37,000			115,000	119,000
Montour [4] and Northampton [3]			53,000	65,000			53,000	65,000
Susquehanna and Wayne	694,000	4,450,000	14,000	89,000	50,000	73,000	758,000	4,612,000
	67,249,000	454,535,000	2,400,000	11,886,000	5,742,000	7,743,000	75,391,000	474,164,000

[1] Value given for shipments is value at which coal left possession of producing company f. o. b. mines and does not include margins of separately incorporated selling companies.
[2] Counties producing dredge coal only.
[3] See Table 5A, footnote 3 and Table 18A, footnote 3.

FRESH-MINED AND CULM-BANK COAL, BREAKER AND WASHERY PRODUCT

Fresh-mined, culm-bank, and river coal.—Anthracite is now produced from three sources—from mines, from old culm banks, and from the rivers that drain the anthracite region. The mines are, of course, the primary source. As it leaves the mines the coal consists of fragments of all sizes, from big lumps to fine dust, and is further mingled with rock and refuse from the workings underground. To prepare it for the market, the coal is passed through a breaker in which the refuse and impurities are removed, the largest lumps are crushed, and the cleaned product is sorted into the standard sizes demanded by the trade.

The breakers have always produced some coal of a size too small to be marketed, although as the art of fuel utilization has progressed the limit of marketability has moved downward to smaller and smaller sizes. In the early days of the industry some of the chestnut and all the coal below chestnut size was unmarketable and was dumped in great piles or culm banks near the breakers, often without much thought of its future value. Later, when the market became more tolerant of the smaller coal, washeries were built to rework the coal in the culm banks and to recover the pea and as much of the steam sizes as could be disposed of. To-day all coal of the standard steam sizes—buckwheat, rice, and barley—and some material still smaller is sold or used for colliery fuel, and the old culm banks are being eaten away. Yet the counterpart of the old bank is seen in the accumulation of fine sediment from the wash water of the breakers, which careful operators recover in settling pools before allowing the water to escape to the streams. That a market for this material will develop seems reasonably sure.

Even present practice does not extract all the fine particles of coal from the waste water of the breakers and washeries. The blackened creeks and rivers of the region are still transporting millions of tons of carbon, and in the earlier days the quantities thus carried downstream were still greater. The deposition of this load of coal here and there on the river bottoms has created a third source of anthracite, from which, by dredging, some hundreds of thousands of tons of steam sizes are now recovered annually.

Difficulty of separating the statistics.—As all three sources—fresh-mined coal, culm-bank coal, and river coal—contribute to the country's supply of anthracite, it is important to cover them all in order to ascertain the total production. On the other hand, as the methods and cost of production differ greatly, it is important that the three sources be accurately distinguished in the statistics. No difficulty is experienced in separating the figures of production by dredges, because the operation is entirely distinct and is generally conducted by separate companies not connected with the mining corporations. Between the fresh-mined and the culm-bank coal, however, it is difficult to draw a sharp line that can be maintained throughout the statistics of the industry.

Breaker product includes some culm-bank coal.—At first thought it would appear that the output of the breakers might be taken as equivalent to the fresh-mined production and that of the washeries as equivalent to the culm-bank production. But although this statement is in general true, there are many exceptions. Coal from a washery may be passed through a breaker for further sizing and cleaning. Again, coal from a culm-bank may go directly to a breaker for preparation without passing through a washery at all. The labor employed at the washery may at other times be engaged on a breaker of the same company, and the company may be unable to state accurately how the force is divided between its fresh-mined and its culm-bank operations. Yet it is desirable that the particulars of labor employed be kept comparable, because one man can produce much more culm-bank coal daily than fresh-mined coal. The difficulty is increased by the varying accounting practices of the companies.

Reconciliation of fresh-mined, culm-bank, and breaker product.—As the best solution of this problem, the individual breaker or washery has in recent years been taken as the producing unit to be canvassed in statistical inquiries. The mining company has been asked to report the output of each breaker and each washery, with the related figures of men employed and time worked. From these individual breaker reports an effort was formerly made, by further questioning the producers, to eliminate the culm-bank coal, but it was found impossible to make this elimination complete. Since 1923, therefore, the reports from the individual breakers and washeries have been tabulated under the captions of "breaker product" and "washery product," and these captions are used throughout the principal tables of this report. Where this is done no attempt is made to eliminate culm-bank coal from the totals of "breaker product."

To obtain accurate totals of the fresh-mined and culm-bank coal produced, a supplemental inquiry is now sent to the producers in which each company is asked for a recapitulation of its culm-bank and fresh-mined production from all operations combined. The results are shown in Table 9A. In 1926, out of 73,375,920 tons handled by the breakers, 1,536,000 tons was culm-bank coal. The fresh-mined coal proper was 71,839,920 tons. The quantity handled by washeries was 1,197,908 tons, but, including the 1,536,000 tons of bank coal run through breakers, the total produced from culm banks was 2,733,908 tons.

TABLE 9A.—*Comparison of anthracite production in 1923–1926 classified as fresh-mined, culm-bank, and river coal and as breaker, washery, and dredge product, in gross tons*

	Classified by source of coal	Classified by type of preparation plant	Difference
1923			
Fresh-mined coal	76,135,538		+2,332,837
Breaker product		78,468,375	
Culm-bank coal	[1] 6,348,963		−2,332,837
Washery product		4,016,126	
River coal	853,900		
Dredge product		853,900	
	83,338,401	83,338,401	
1924			
Fresh-mined coal	75,656,355		+1,013,000
Breaker product		76,669,355	
Culm-bank coal	[1] 2,112,813		−1,013,000
Washery product		1,099,813	
River coal	736,959		
Dredge product		736,959	
	78,506,127	78,506,127	
1925			
Fresh-mined coal	52,437,725		+927,000
Breaker product		53,364,725	
Culm-bank coal	[1] 1,849,276		−927,000
Washery product		922,276	
River coal	906,882		
Dredge product		906,882	
	55,193,883	55,193,883	
1926			
Fresh-mined coal	71,839,920		+1,536,000
Breaker product		73,375,920	
Culm-bank coal	[1] 2,733,908		−1,536,000
Washery product		1,197,908	
River coal	816,754		
Dredge product		816,754	
	75,390,582	75,390,582	

[1] Includes about 2,300,000 tons of coal put through the breakers in 1923, 1,013,000 tons in 1924, 927,000 tons in 1925, and 1,536,000 tons in 1926.

Declining importance of culm-bank coal.—The gradual cleaning up of the old culm banks and the declining prices of steam sizes have acted to reduce the quantity of culm-bank coal recovered in recent years. In comparison with the 6,348,963 tons recovered from banks in 1923, the total for 1926 shows a decrease of 56.9 per cent.

The practice of treating culm-bank coal in breakers is commonest in the Western Middle and Southern fields. Table 10A shows that, in 1926, 271,000 tons were so handled in the Northern, 230,000 in the Eastern Middle, 542,000 in the Western Middle, and 493,000 in the Southern field.

TABLE 10A.—*Culm-bank coal put through breakers, by fields, 1924–1926, gross tons*

Year	Northern	Eastern Middle	Western Middle	Southern	Total
1924	170,000	220,000	386,000	237,000	1,013,000
1925	173,000	181,000	396,000	177,000	927,000
1926	271,000	230,000	542,000	493,000	1,536,000

By limiting the comparison to shipments, the relative growth of breaker, washery, and dredge operations can be shown back to 1890. (Table 11A.) Washery shipments began to assume importance in the late nineties and reached their maximum in 1918 with 6,506,000 tons. In the last three years washery shipments have been smaller than at any time since 1897. The first statistical record of shipments by dredges was in 1909, when 9,000 tons were sold. The maximum tonnage of river coal shipped was reached in 1922.

TABLE 11A.—*Anthracite shipped from breakers, washeries, and dredges, 1890–1926, gross tons*

[Includes shipments for Sullivan County, except for 1895, for which no data are available. Detailed figures for each year of the period up to 1924 will be found in Coal in 1924, p. 574]

Year	Breakers [1]	Washeries [1]	Dredges	Total
1890	36,573,000	42,000	----------	36,615,000
1895	45,430,000	1,081,000	----------	46,511,000
1900	43,218,000	2,059,000	----------	45,277,000
1905	59,010,000	2,644,000	----------	61,654,000
1910	62,417,000	3,296,000	22,000	65,735,000
1915	66,174,000	2,475,000	17,000	68,666,000
1917	72,077,000	5,366,000	47,000	77,490,000
1918	70,090,000	6,506,000	125,000	76,721,000
1919	64,632,000	3,017,000	323,000	67,972,000
1920	63,599,000	4,616,000	396,000	68,611,000
1921	67,981,000	1,308,000	265,000	69,554,000
1922	37,907,000	2,600,000	567,000	41,074,000
1923	69,289,000	3,754,000	385,000	73,428,000
1924	67,592,000	1,060,000	319,000	68,971,000
1925	46,615,000	872,000	520,000	48,007,000
1926	65,826,000	1,068,000	355,000	67,249,000

[1] In recent years a considerable tonnage of culm-bank coal has been handled in the breakers, so that the figures of shipments from washeries are less than the sales of culm-bank coal.

DETAILS OF SHIPMENTS BY REGIONS AND SIZES

TABLE 12A.—*Anthracite shipped, by regions and sizes, 1925–26, in gross tons*

[The figures of shipments from breakers include a considerable tonnage of culm-bank coal handled in the breakers]

Size	Lehigh region			Schuylkill region			Wyoming region			Sullivan County breakers	Total	
	Breakers	Washeries	Dredges	Breakers	Washeries	Dredges	Breakers	Washeries	Dredges		Quantity	Percentage of total
1925												
Lump				4,693							4,693	
Broken	72,172			191,372			967,076	206		392	1,231,218	2.6
Egg	739,665	4,504		1,315,033	3,556		4,246,372	11,598		9,181	6,329,909	13.2
Stove	1,419,865	6,299		2,950,120	8,641		6,961,585	11,410		17,881	11,375,801	23.7
Chestnut	1,737,574	10,974		3,293,549	33,558		7,409,369	68,723		23,351	[1]12,577,098	26.2
Pea	478,830	12,745		985,863	33,006	1,064	1,131,983	26,813		12,068	2,682,372	5.6
Total domestic	4,448,106	34,522		8,740,630	78,761	1,064	20,716,385	118,750		62,873	34,201,091	71.3
Buckwheat No. 1	827,500	25,972		1,906,688	75,362	6,953	3,040,528	38,072			5,921,075	12.3
Buckwheat No. 2 (rice)	492,854	30,362		1,043,630	84,905		1,934,885	84,906			3,671,542	7.6
Buckwheat No. 3 (barley)	551,760	83,631	52,765	1,381,460	141,627	169,073	949,849	65,526			3,395,691	7.1
Boiler	1,152		36,176	21		26,178	34,304				97,831	.2
Other [2]	134,260			135,077	92	162,974	171,675	9,788	64,593	41,786	720,245	1.5
Total steam	2,007,526	139,965	88,941	4,466,876	301,986	365,178	6,131,241	198,292	64,593	41,786	13,806,384	28.7
Grand total	6,455,632	174,487	88,941	13,207,506	380,747	366,242	26,847,626	317,042	64,593	104,659	48,007,475	100.0
1926												
Lump	5			5,182							5,187	
Broken	44,326	440		166,159	6		839,656	294		3,947	1,054,828	1.5
Egg	870,490	2,236		1,895,430	8,523		6,102,919	24,935		18,851	8,923,384	13.3
Stove	2,051,169	4,014		4,271,004	19,774		10,179,478	51,410		39,392	16,616,241	24.7
Chestnut	2,423,342	4,439		4,714,825	63,740		10,627,276	119,857		47,977	[1]18,001,456	26.8
Pea	705,794	949		1,331,694	32,840	100	1,573,007	29,268		25,642	3,699,294	5.5
Total domestic	6,095,126	12,078		12,384,294	124,883	100	29,322,336	225,764		135,809	48,300,390	71.8
Buckwheat No. 1	1,098,046	2,084		2,323,849	85,220	1,310	4,091,045	60,916			7,662,470	11.4
Buckwheat No. 2 (rice)	690,204	1,288		1,467,829	86,289	6,109	2,859,036	257,615			5,368,370	8.0
Buckwheat No. 3 (barley)	1,001,692	1,203		1,789,065	144,357	205,906	1,490.532	50,439			4,683,194	7.0

Boiler	186,685	34		12,193		31,510	61,139			62,231	353,792	
Other [2]	310,238	254		172,267	3,315	96,475	264,656	12,071	13,537	7,917	880,730	1.
Total steam	3,286,865	4,863		5,765,203	319,181	341,310	8,766,408	381,041	13,537	70,148	18,948,556	28.2
Grand total	9,381,991	16,941		18,149,497	444,064	341,410	38,088,744	606,805	13,537	205,957	67,248,946	100.0

[1] Includes: 1925, 5,248 tons, and 1926, 16,409 tons of "range" coal.
[2] Includes buckwheat No. 4, silt, culm, screenings, and mine-run coal.

TABLE 13A.—*Value of anthracite shipped, by regions and sizes, 1925-26* [1]

1925

Size	Lehigh region						Schuylkill region					
	Breakers		Washeries		Dredges		Breakers		Washeries		Dredges	
	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton
Lump							$41,545	$8.85				
Broken	$580,028	$8.04					1,658,867	8.67				
Egg	6,363,442	8.61	$39,625	$8.80			11,339,571	8.62	$29,337	$8.25		
Stove	12,806,296	9.02	57,708	9.16			26,728,563	9.06	74,772	8.65		
Chestnut	15,028,502	8.65	94,522	8.61			28,821,979	8.75	275,518	8.21		
Pea	2,622,304	5.48	67,965	5.33			5,232,607	5.30	159,357	4.83	$4,025	$3.78
Total domestic	37,405,572	8.41	259,820	7.53			73,823,132	8.45	538,984	6.84	4,025	3.78
Buckwheat No. 1	2,096,334	2.53	61,238	2.36			4,542,544	2.38	164,000	2.18	17,286	4.29
Buckwheat No. 2 (rice)	948,220	1.92	60,974	2.01			1,868,490	1.79	150,274	1.77		
Buckwheat No. 3 (barley)	800,207	1.45	125,448	1.50	$58,042	$1.10	1,691,372	1.22	188,667	1.33	166,954	.99
Boiler	3,122	2.71			28,941	.80	29	1.39			26,950	1.03
Other	67,686	.50					52,003	.38	40	.43	167,054	1.03
Total steam	3,915,569	1.95	247,660	1.77	86,983	.98	8,154,438	1.83	502,981	1.67	378,244	1.03
Grand total	41,321,141	6.40	507,480	2.91	86,983	.98	81,977,570	6.21	1,041,965	2.74	382,269	1.04

Size	Wyoming region						Sullivan County		All regions	
	Breakers		Washeries		Dredges		Breakers		Total	Average per ton
	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton		
Lump									$41,545	$8.85
Broken	$7,528,755	$7.78	$1,884	$9.15			$3,345	$8.53	9,772,879	7.94
Egg	35,134,773	8.27	99,745	8.60			77,668	8.46	53,089,161	8.39
Stove	60,072,171	8.63	106,823	9.36			152,588	8.53	99,998,921	8.79
Chestnut	61,592,759	8.31	566,887	8.25			202,141	8.66	[2] 106,582,308	8.47
Pea	5,820,402	5.14	136,790	5.10			60,409	5.01	14,103,859	5.26
Total domestic	170,148,860	8.21	912,129	7.68			496,151	7.89	283,588,673	8.29
Buckwheat No. 1	7,756,901	2.55	96,038	2.52					14,734,341	2.49
Buckwheat No. 2 (rice)	3,583,783	1.85	157,306	1.85					6,769,047	1.84
Buckwheat No. 3 (barley)	1,310,332	1.38	90,423	1.38					4,431,445	1.31
Boiler	43,473	1.27							102,515	1.95
Other	513,678	2.99	7,337	.75	$67,823	$1.05	78,082	1.87	953,703	1.32
Total steam	13,208,167	2.15	351,104	1.77	67,823	1.05	78,082	1.87	26,991,051	1.95
Grand total	183,357,027	6.83	1,263,233	3.98	67,823	1.05	574,233	5.49	310,579,724	6.47

[1] Value given is value at which coal left possession of producing company f. o. b. mines and does not include margins of separately incorporated selling companies.
[2] Includes $55,105, value of "range" coal.

TABLE 13A.—*Value of anthracite shipped, by regions and sizes, 1925–26*—Continued

1926

Size	Lehigh region				Schuylkill region					
	Breakers		Washeries		Breakers		Washeries		Dredges	
	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton
Lump	$43	$8.60			$48,311	$9.32				
Broken	371,685	8.39	$3,573	$8.12	1,537,510	9.25	$49	$8.17		
Egg	7,859,575	9.03	20,012	8.95	17,127,064	9.04	67,834	7.96		
Stove	19,155,077	9.34	37,290	9.29	39,988,154	9.36	168,429	8.52		
Chestnut	21,629,412	8.93	39,418	8.88	42,606,473	9.04	526,058	8.25		
Pea	4,304,830	6.10	5,770	6.08	8,054,717	6.05	194,604	5.93	$500	$5.00
Total domestic	53,320,622	8.75	106,063	8.78	109,362,229	8.83	956,974	7.66	500	5.00
Buckwheat No. 1	2,611,468	2.38	4,877	2.34	5,431,050	2.34	196,559	2.31	3,216	2.45
Buckwheat No. 2 (rice)	1,278,274	1.85	2,241	1.74	2,468,017	1.68	144,053	1.67	12,039	1.97
Buckwheat No. 3 (barley)	1,397,528	1.40	1,624	1.35	2,241,791	1.25	202,672	1.40	193,428	.94
Boiler	245,919	1.32	45	1.32	3,794	.31			29,866	.95
Other	124,724	.40	137	.54	86,100	.50	1,458	.44	85,484	.89
Total steam	5,657,913	1.72	8,924	1.84	10,230,752	1.77	544,742	1.71	324,033	.95
Grand total	58,978,535	6.29	114,987	6.79	119,592,981	6.59	1,501,716	3.38	324,533	.95

Size	Wyoming region						Sullivan County		All regions [3]	
	Breakers [3]		Washeries [3]		Dredges		Breakers		Total	Average per ton
	Total	Average per ton	Total	Average per ton	Total	Average per ton	Total	Average per ton		
Lump									$48,354	$9.32
Broken	$6,684,994	$7.96	$2,294	$7.80			$33,550	$8.50	8,633,655	8.18
Egg	52,577,440	8.62	212,055	8.50			161,556	8.57	78,025,536	8.74
Stove	91,739,884	9.01	468,763	9.12			338,937	8.60	151,896,534	9.14
Chestnut	91,272,572	8.59	988,409	8.25			419,689	8.75	[2] 157,482,031	8.75
Pea	9,258,384	5.89	163,603	5.59			138,477	5.40	22,120,885	5.98
Total domestic	251,533,274	8.58	1,835,124	8.13			1,092,209	8.04	418,206,995	8.66
Buckwheat No. 1	10,888,569	2.66	143,961	2.36					19,279,700	2.52
Buckwheat No. 2 (rice)	5,168,035	1.81	469,984	1.82					9,542,643	1.78
Buckwheat No. 3 (barley)	2,003,465	1.34	71,539	1.42					6,112,047	1.31
Boiler	85,690	1.40					111,879	1.80	477,193	1.35
Other	569,159	2.15	27,138	2.25	$10,830	$0.80	11,278	1.42	916,308	1.04
Total steam	18,714,918	2.13	712,622	1.87	10,830	.80	123,157	1.76	36,327,891	1.92
Grand total	270,248,192	7.10	2,547,746	4.20	10,830	.80	1,215,366	5.90	454,534,886	6.76

[1] Includes $142,294, value of "range" coal.
[2] See Table 5A, footnote 3, and Table 18A, footnote 3, for change in method of estimating values for a large company reporting tonnage but not value.

TRENDS IN SIZES SHIPPED

Details of the quantity and value of each size shipped in 1925 and 1926 are given by regions in Tables 12A and 13A. Table 14A shows the relative percentage of each size in the total shipments from 1919 to 1926.

Fluctuation in the proportions of steam and domestic sizes shipped from year to year is chiefly caused by market conditions. High prices of bituminous coal, as in 1920, 1922, and early 1923, stimulate the sale of the steam sizes, and a shortage of domestic anthracite, as in 1922–23 and 1925–26, may have the same effect.

Within the group of domestic sizes the relative proportions of each size are affected by the changes in the standards of sizing which have been made from time to time. Effective April 1, 1925, the anthracite operators' conference recommended that the following standards for sizing and preparation be adopted by all producers:

	Through (round mesh) (inches)	Over (round mesh) (inches)	Maximum undersize (per cent)	Slate [1] (per cent)	Bone [1] (per cent)
Broken	4 7/16	3 7/16	15	2	2
Egg	3 7/16	2 1/16	15	3	3
Stove	2 1/16	1 9/16	15	4	4
Chestnut	1 9/16	1 1/16	[2] 15	5	5
Pea	1 1/16	9/16	15	7½	7½

[1] For each 1 per cent reduction of slate there may be a 2 per cent increase of bone.
[2] In addition not more than 5 per cent unavoidable breakage will be allowed.

In view of the changes introduced by the new size standards it is interesting to compare the relative proportions of the five principal domestic sizes in 1926 with those in 1923 and 1924. The following figures, abstracted from Table 14A, represent percentages of the total shipments for the year.

	1923	1924	1926
Broken	4.8	2.7	1.6
Egg	14.9	14.3	13.3
Stove	18.6	21.8	24.7
Chestnut	25.0	26.2	26.8
Pea	8.1	8.2	5.5

It will be seen that there was a sharp reduction in the percentages of pea and broken, a small reduction in the percentage of egg, and an increase in the percentages of chestnut and particularly stove. The net result has been to increase the available quantities of the sizes most in favor with the public, thereby benefiting the consumers and simplifying the marketing problems of the producers.

TABLE 14A.—*Percentage of anthracite shipped, by regions and sizes, 1919-1926* [1]

Region and size of coal	Percentage of total							
	1919	1920	1921	1922	1923	1924	1925	1926
Lehigh:								
Lump								
Broken	3.3	3.8	1.9	1.7	1.7	1.0	1.1	0.5
Egg	12.3	12.6	14.1	12.0	14.0	13.0	11.1	9.3
Stove	16.4	16.5	19.0	17.8	16.8	19.4	21.2	21.9
Chestnut	24.4	24.4	25.6	24.7	24.3	25.8	26.0	25.8
Pea	10.5	10.4	10.7	11.0	9.3	9.4	7.3	7.5
Total domestic	66.9	67.7	71.3	67.2	66.1	68.6	66.7	65.0
Buckwheat No. 1	13.3	14.1	13.5	14.2	14.2	13.5	12.7	11.7
Buckwheat No. 2 (rice)	7.5	7.3	6.7	7.7	7.7	7.1	7.8	7.3
Buckwheat No. 3 (barley)	8.5	9.0	7.2	8.6	10.0	9.3	10.2	10.7
Boiler	1.4	.5	.2	1.3	.5	.3	.6	2.0
Other	2.4	1.4	1.1	1.0	1.5	1.2	2.0	3.3
Total steam	33.1	32.3	28.7	32.8	33.9	31.4	33.3	35.0
Schuylkill:								
Lump	.1	.1	.1	[2]	[2]	[2]	[2]	[2]
Broken	3.8	4.5	3.2	3.0	3.2	1.6	1.4	0.9
Egg	12.3	11.2	12.6	9.6	11.5	11.3	9.5	10.1
Stove	17.2	14.9	18.9	17.0	16.6	20.0	21.2	22.7
Chestnut	22.5	21.7	24.2	[3] 22.2	22.6	23.8	23.8	25.2
Pea	11.1	10.2	10.3	9.2	10.1	10.0	7.3	7.2
Total domestic	67.0	62.6	69.3	61.0	64.0	66.7	63.2	66.1
Buckwheat No. 1	17.0	17.6	17.4	16.9	17.0	15.3	14.3	12.7
Buckwheat No. 2 (rice)	8.0	8.9	6.2	7.5	7.2	5.9	8.1	8.2
Buckwheat No. 3 (barley)	6.9	8.2	6.1	10.7	10.4	11.0	12.1	11.3
Boiler	.4	2.0	.4	.5	.1	.1	.2	.2
Other	.7	.7	.6	3.4	1.3	1.0	2.1	1.5
Total steam	33.0	37.4	30.7	39.0	36.0	33.3	36.8	33.9
Wyoming:								
Lump								
Broken	4.7	5.3	4.1	5.2	6.3	3.5	3.6	2.2
Egg	15.9	16.9	16.0	16.0	17.1	16.1	15.6	15.8
Stove	21.8	20.2	22.8	22.3	20.2	23.3	25.6	26.4
Chestnut	27.6	27.5	28.3	[3] 26.0	[3] 26.5	[3] 27.6	[3] 27.5	[3] 27.8
Pea	7.7	6.0	6.9	6.5	6.6	7.1	4.3	4.1
Total domestic	77.7	75.9	78.1	76.0	76.7	77.6	76.6	76.3
Buckwheat No. 1	10.3	11.0	11.5	11.4	10.8	10.6	11.3	10.7
Buckwheat No. 2 (rice)	7.1	7.8	6.6	7.0	7.3	6.9	7.4	8.1
Buckwheat No. 3 (barley)	3.4	3.6	3.2	4.3	4.4	4.1	3.7	4.0
Boiler	.9	1.0	.5	.6	.3	.2	.1	.2
Other	.6	.7	.1	.7	.5	.6	.9	.7
Total steam	22.3	24.1	21.9	24.0	23.3	22.4	23.4	23.7
Sullivan:								
Lump								
Broken	4.5	4.5	4.3	4.2	5.0	.1	.4	1.9
Egg	9.9	9.0	10.7	6.4	9.9	7.7	8.8	9.2
Stove	14.3	14.0	18.6	9.9	16.4	14.5	17.1	19.1
Chestnut	20.6	20.4	27.6	15.4	21.8	18.6	22.3	23.3
Pea	13.7	12.5	14.6	9.1	15.8	9.6	11.5	12.4
Total domestic	63.0	60.4	75.8	45.0	68.9	50.5	60.1	65.9
Buckwheat No. 1								
Buckwheat No. 2 (rice)								
Buckwheat No. 3 (barley)								
Boiler and other	37.0	39.6	24.2	55.0	31.1	49.5	39.9	34.1
Total steam	37.0	39.6	24.2	55.0	31.1	49.5	39.9	34.1
Grand total:								
Lump	[2]	.1	[2]	[2]	[2]	[2]	[2]	[2]
Broken	4.2	4.8	3.6	4.0	4.8	2.7	2.6	1.5
Egg	14.3	14.5	14.7	13.3	14.9	14.3	13.2	13.3
Stove	19.6	18.0	21.1	19.9	18.6	21.8	23.7	24.7
Chestnut	25.6	25.2	26.8	[3] 24.6	[3] 25.0	[3] 26.2	[3] 26.2	[3] 26.8
Pea	9.2	8.0	8.4	8.0	8.1	8.2	5.6	5.5
Total domestic	72.9	70.6	74.6	69.8	71.4	73.2	71.3	71.8

[1] Includes washery and dredge coal. [2] Less than 0.1 per cent [3] Includes range coal.

TABLE 14A.—*Percentage of anthracite shipped, by regions and sizes, 1919–1926*—Continued

Region and size of coal	Percentage of total							
	1919	1920	1921	1922	1923	1924	1925	1926
Grand total—Continued.								
Buckwheat No. 1	12.6	13.4	13.4	13.5	13.1	12.3	12.3	11.4
Buckwheat No. 2 (rice) [1]	7.4	8.0	6.5	7.2	7.3	6.7	7.6	8.0
Buckwheat No. 3 (barley)	5.2	5.7	4.6	6.9	7.0	6.7	7.1	7.0
Boiler	.8	1.2	.4	.7	.2	.2	.2	.5
Other	1.1	1.1	.5	1.9	1.0	.9	1.5	1.3
Total steam	27.1	29.4	25.4	30.2	28.6	26.8	28.7	28.2

[1] Includes bird's-eye coal.

A summary of shipments for the last decade by sizes is given in Table 15A. Except for the reduction in percentage of pea since 1924 already referred to and the corresponding increase in the percentage larger than pea, there has been no marked change in the composition of the breaker shipments. The total shipments now show a smaller percentage of the steam sizes, chiefly because of a decline in washery shipments in relation to the total.

In both this and the preceding tables the figures of total shipments include dredge coal and the product of Sullivan County. By excluding these two items it is possible to show the trend in sizes back to 1890. At that time the demand for the small sizes was very restricted, and 76.9 per cent of the shipments consisted of sizes above pea. For 1926 the corresponding figure is 66.7 per cent.

TABLE 15A.—*Anthracite shipped, by sizes, 1917–1926* [1]

[A table separating shipments of domestic sizes from pea and steam for each year from 1890 to 1924, excluding, however, Sullivan County and dredge coal, will be found in Coal in 1924, p. 575]

	Sizes above pea		Pea		Sizes below pea		Total (gross tons)
	Gross tons	Percentage of total	Gross tons	Percentage of total	Gross tons	Percentage of total	
Breaker product:							
1917	46,640,319	64.7	6,298,870	8.7	19,138,145	26.6	72,077,334
1918	45,323,253	64.7	5,798,401	8.3	18,968,580	27.0	70,090,234
1919	42,937,454	66.4	5,884,492	9.1	15,809,757	24.5	64,631,703
1920	42,209,170	66.4	5,008,050	7.9	16,381,463	25.7	63,598,683
1921	45,796,115	67.4	5,720,904	8.4	16,464,397	24.2	67,981,416
1922	25,046,679	66.1	2,967,355	7.8	9,892,469	26.1	37,906,503
1923	45,651,693	65.9	5,544,915	8.0	18,091,818	26.1	69,288,426
1924	44,566,747	65.9	5,593,926	8.3	17,431,597	25.8	67,592,270
1925	31,359,250	67.3	2,608,744	5.6	12,647,429	27.1	46,615,423
1926	44,301,428	67.3	3,636,137	5.5	17,888,624	27.2	65,826,189
Total shipments:							
1917	47,195,895	60.9	6,824,003	8.8	23,470,145	30.3	77,490,043
1918	45,994,903	60.0	6,471,381	8.4	24,254,873	31.6	76,721,157
1919	43,349,551	63.8	6,237,398	9.2	18,385,346	27.0	67,972,295
1920	42,984,656	62.6	5,457,588	8.0	20,168,519	29.4	68,610,763
1921	46,051,199	66.2	5,865,379	8.4	17,637,985	25.4	69,554,563
1922	25,409,723	61.8	3,278,136	8.0	12,385,979	30.2	41,073,838
1923	46,479,297	63.3	5,928,618	8.1	21,019,797	28.6	73,427,712
1924	44,825,550	65.0	5,689,000	8.2	18,456,431	26.8	68,970,981
1925	31,518,719	65.7	2,682,372	5.6	13,806,384	28.7	48,007,475
1926	44,601,096	66.3	3,699,294	5.5	18,948,556	28.2	67,248,946

[1] Includes shipments of dredge coal.

LOCAL SALES

Shipments to points outside the mining region absorb most of the production of anthracite and provide most of the industry's gross revenue, but considerable tonnages are also sold in the thriving communities within the anthracite region itself. These "local sales" (as they are designated in the tables of this report) plus the shipments constitute the commercial or revenue-producing part of the production.

With the growth of population and of other industries in Scranton, Wilkes-Barre, Hazleton, Pottsville, and other cities of the region the local sales have increased in volume. In 1913 they amounted to 1,793,814 tons; in 1923, to 2,900,314 tons; and in 1926, in spite of the suspension, to 2,399,474 tons. They now constitute from 3 to 4 per cent of the total production as against 2.4 per cent before the war. (Table 16A.) A factor in this change is the development of electric central stations in the region which burn the small sizes to generate electricity now bought by some operators who formerly generated their own steam power.

TABLE 16A.—*Disposition of total output of anthracite, 1890–1926, in per cent*

Year	Shipments	Local sales	Colliery fuel	Year	Shipments	Local sales	Colliery fuel
1890	88.3	4.3	7.4	1921	86.1	3.1	10.8
1895	89.8	2.3	7.9	1922	84.1	4.4	11.5
1900	88.4	2.1	9.5	1923	88.1	3.5	8.4
1905	88.9	2.0	9.1	1924	87.8	3.5	8.7
1910	87.1	2.4	10.5	1925	87.0	4.7	8.3
1915	86.4	2.4	11.2	1926	89.2	3.2	7.6
1920	85.8	3.2	11.0				

In order to throw light on the character of the local market the bureau addressed a special inquiry to each producer of fresh-mined and culm-bank coal, asking for a statement of the sizes sold locally in 1925 and 1926. The replies of those who could supply the information are given below. The table covers about two-thirds of the total local sales of breaker and washery coal, sales of river coal not being included.

The local sales of the domestic sizes were found to consist largely of chestnut and pea and very little of stove, egg, and broken. In the shipments outside the region chestnut made up 26.8 per cent in 1926, while in the local sales of the companies reporting it made up 43.5 per cent. Pea made up only 5.5 per cent of the shipments but fully 25 per cent of the local sales of the companies reporting.

The large proportion of pea in the trade within the region helps to explain the low average value of the local sales as compared with the shipments; this fact is brought out in Table 17A.

TABLE 17A.—*Tabulation of reports of certain operators of breakers and washeries as to the sizes of anthracite sold locally in 1925–26*

[Note that only 65 per cent of the total local sales of breaker and washery product are accounted for in 1925 and only 66 per cent in 1926]

Size	1925		1926	
	Gross tons accounted for	Per cent of total	Gross tons accounted for	Per cent of total
Lump	87		718	0.1
Broken	7,938	0.5	9,376	.7
Egg	8,208	.5	9,271	.7
Stove	43,390	3.0	44,461	3.5
Chestnut	580,573	41.0	558,312	43.5
Pea	349,177	24.6	320,496	25.0
Buckwheat No. 1	154,679	10.9	158,069	12.3
Buckwheat No. 2	88,007	6.2	47,665	3.7
Buckwheat No. 3	24,139	1.7	90,170	7.0
Boiler	153,306	10.9	34,523	2.7
Other	9,768	.7	10,344	.8
	1,419,272	100.0	1,283,405	100.0

TRENDS IN VALUES AND PRICES

SOURCE OF INFORMATION AND METHODS OF ANALYSES

Margins of sales agents not included.—The figures of value in this study represent the value at the breaker or washery, as reported by the operating companies. In making its report the company is requested to "estimate value of the product not sold" and to "exclude selling expenses."

From this it will be seen that where a producing company sells its output to a separately organized sales company (the practice of many, including certain of the largest producers) the value reported will exclude the margin of the sales company and may therefore be somewhat less than the circular price at which the coal in question is placed on the general market. This fact should be borne in mind in considering the variations between different regions shown in the tables for the same sizes of coal.[46]

Estimates included in the figures of value.—The reports furnished are in writing and are signed by responsible officers of the mining companies. Complete reports have been received from all operators as to tonnage produced and other points touching the physical operation of the mines. A few companies made no reply concerning the value of the product, however, and in order to round out the totals estimates of these values have been made. The estimates represent only 13.9 per cent of the total value shown in 1926 because, aside from a few extremely small producers, only one company failed to report. The values for this company, a producer in the Wyoming region, were estimated in 1926 as follows: The tonnage which it reported of each size from broken to No. 1 buckwheat was multiplied by the company's average circular price for that size as quoted in the trade journals for the year. The tonnage which it reported for

[46] See Gordon, Ellery B., Distribution of Anthracite: U. S. Coal Commission Rept., pt. 2, pp. 677, 681, 682, for a statement of the marketing arrangements of the principal companies and the quantities handled through sales agents.

each size smaller than No. 1 buckwheat was multiplied by the average sales realization obtained on that size by all other producers in the Wyoming region.

It is to be noted that this method of estimate differs from that used in earlier years. From 1920 to 1925 the values were estimated by multiplying the tonnage of each size as reported by the company (including the larger as well as the steam sizes) by the average sales realization on that size reported by all other producers in the Wyoming region.

The method of estimate used in 1926 is believed to give a more accurate result, but because of the change of method the figures for 1926 are not exactly comparable with those for earlier years. Had the earlier method been used the total value in 1926 would have been eight-tenths of 1 per cent less. The break in comparability is therefore slight, but to avoid misunderstanding attention is drawn to it in footnotes in the tables where it is involved.

AVERAGE SALES REALIZATIONS, 1920–1926

In Table 18A the changes in the average sales realization on each size may be traced year by year from 1920 to 1926. To insure comparability the table is based on the shipments of breaker coal only, excluding the dredge and washery product, and in the following discussion the figures for 1926 are those given in the footnotes of that table, so computed as to be exactly comparable with the earlier years.

In considering the changes in sales realization it must be remembered that costs of production have also changed. Prices of mining supplies have fluctuated; State and local taxes have shown a tendency to grow; and wage rates were advanced sharply in November, 1920, and by an additional 10 per cent in September, 1923. As the workings grow deeper and resort is had to second and third mining and to progressively thinner beds the costs increase proportionately, except as better engineering can offset the increasing difficulties of nature. The report of the United States Coal Commission showed large increases in cost in the period from 1913 to March, 1923.[47] Since then no record of cost is available, but from the trend of wage scales and other factors it is clear that the costs in 1926 were materially greater than in the period before September, 1923.

Decline in price of steam sizes.—The figures show clearly how far the industry has gone in adjusting its prices to the demands of the market. Since 1920 there has been a steady reduction in the average sales realization on the steam sizes in order to meet the pressure of low-price bituminous coal. In 1920 the average realization on buckwheat No. 1 was $3.76, and as late as 1923 it was $3.48. Thereafter it steadily declined, reaching $2.39 in 1926. The average receipts on buckwheat No. 2 declined from $2.69 in 1920 to $1.78 in 1926. Much the same trend is shown by the entire group of steam sizes, for which the average receipts were $3.22 in 1920, $2.64 in 1923, and only $1.88 in 1926. By years, the averages have been as follows:

	1920	1921	1922	1923	1924	1925	1926
Buckwheat No. 1	$3.76	$3.43	$3.56	$3.48	$2.94	$2.49	$2.39
Buckwheat No. 2	2.69	2.27	2.37	2.23	1.93	1.84	1.78
All steam sizes	3.22	2.75	2.77	2.64	2.25	2.00	1.88

[47] Wing, David L., and Black, James E., Cost of Production of Anthracite: U. S. Coal Commission Rept., pt. 2, pp. 837–882.

Prices of pea coal.—Pea coal also has shown a downward tendency in late years. From 1920 to 1923 pea brought increasing returns, the average receipts rising from $5.70 in 1920 to $6.18 in 1923. Thereafter prices dropped to $5.60 in 1924 and $5.27 in 1925, in spite of the fact that production costs had increased meanwhile. In 1926 pea brought an average of $5.98, but the improvement over 1925 is partly explained by the fact that no discounts were offered in the summer of 1926.

Pea coal

1920	$5.70	1924	$5.60
1921	5.74	1925	5.27
1922	5.92	1926	5.98
1923	6.18		

Advances on larger domestic sizes.—On the domestic sizes above pea there was a large increase up to 1923, but since then the increase has been relatively small. In 1923 fresh-mined stove brought an average of $8.56 a ton and in 1926, $9.09 a ton, an increase of 53 cents. On all the domestic sizes combined, including pea, the average increase from 1923 to 1926 was only 37 cents a ton. By years the figures were as follows:

	Stove	Total domestic, including pea		Stove	Total domestic, including pea
1920	$7.51	$7.23	1924	$8.74	$8.25
1921	7.67	7.39	1925	8.79	8.30
1922	8.03	7.77	1926	9.09	8.60
1923	8.56	8.23			

The increase in the average for 1926 over that for 1925 is partly explained by the fact that summer discounts were offered in 1925 but not in 1926.

Trend of average for all sizes.—The decline in prices of pea and the steam sizes has so far counterbalanced the advance on the domestic sizes that since 1923 the average realization on all sizes combined has shown practically no increase. Year by year the grand average has been as follows:

All sizes, breaker shipments

1920	$6.16	1924	$6.70
1921	6.27	1925	6.59
1922	6.48	1926	6.78
1923	6.77		

In 1923 breaker shipments brought a grand average of $6.77. In 1926 the comparable figure was $6.78.[48] This was an increase of only 1 cent in average realization, in spite of an evident increase in cost of production. In fact, in 1924 and 1925 the average sales realization on all sizes was actually less than in 1923.

The course of the average realization in the last three years is thus in striking contrast to the steady increase which characterized the period from 1916 to 1923. The companies have absorbed increasing costs either out of profits or out of greater efficiencies in operation, and the industry has gone far to adjust its price structure to the changing needs of the market.

[48] The average of all sizes using the new method of estimating the values of shipments of the company not reporting is $6.84. This shows an apparent increase of 7 cents over 1923, but of this all but 1 cent is due to the change in method of estimate already referred to.

TABLE 18A.—*Average sales realization per gross ton on anthracite shipments from breakers, by regions and sizes, 1920–1926*

[Value does not include margins of separately incorporated sales companies]

Region and size of coal	1920	1921	1922	1923	1924	1925	1926
Lehigh:							
Lump	$7.81						$8.60
Broken	7.07	$7.51	$7.73	$8.01	$8.32	$8.04	8.39
Egg	7.41	7.68	8.03	8.69	8.78	8.61	9.03
Stove	7.62	7.94	8.06	8.65	9.10	9.02	9.34
Chestnut	7.64	7.87	8.03	8.60	8.95	8.65	8.93
Pea	5.72	5.92	5.93	6.34	5.90	5.48	6.10
Total domestic	7.27	7.55	7.69	8.31	8.53	8.41	8.75
Buckwheat No. 1	3.80	3.49	3.66	3.60	2.96	2.53	2.38
Buckwheat No. 2 (rice)	3.03	2.40	2.55	2.49	2.08	1.92	1.85
Buckwheat No. 3 (barley)	2.03	1.54	1.75	1.55	1.48	1.45	1.40
Total steam [1]	3.07	2.66	2.86	2.70	2.25	1.95	1.72
Total all sizes	6.03	6.20	6.23	6.58	6.61	6.40	6.29
Schuylkill:							
Lump	6.99	7.50	7.70	8.35	5.18	8.85	9.32
Broken	7.55	7.76	8.30	8.79	8.71	8.67	9.25
Egg	7.47	7.63	8.12	8.85	8.75	8.62	9.04
Stove	7.71	7.81	8.27	8.87	9.16	9.06	9.36
Chestnut	7.76	7.92	[2] 8.28	8.86	9.00	8.75	9.04
Pea	5.80	5.80	6.07	6.35	5.68	5.30	6.05
Total domestic	7.38	7.52	7.97	8.49	8.50	8.45	8.83
Buckwheat No. 1	3.83	3.44	3.50	3.43	2.69	2.38	2.34
Buckwheat No. 2 (rice)	2.65	2.22	2.29	2.18	1.91	1.79	1.68
Buckwheat No. 3 (barley)	1.81	1.37	1.50	1.35	1.23	1.22	1.25
Total steam [1]	3.06	2.78	2.65	2.57	2.04	1.83	1.77
Total all sizes	5.98	6.15	6.30	6.56	6.46	6.21	6.59
Wyoming:							
Lump	9.40	5.21					
Broken	6.75	7.20	7.42	7.57	7.73	7.78	[3] 7.96
Egg	7.10	7.28	7.80	8.31	8.29	8.27	[3] 8.62
Stove	7.40	7.56	7.91	8.40	8.50	8.63	[3] 9.01
Chestnut	7.40	7.50	[2] 7.96	[2] 8.35	[2] 8.34	[2] 8.31	[2 3] 8.59
Pea	5.60	5.64	5.80	5.96	5.45	5.14	[3] 5.89
Total domestic	7.15	7.30	7.70	8.09	8.08	8.21	[3] 8.58
Buckwheat No. 1	3.68	3.40	3.58	3.48	3.11	2.55	[3] 2.66
Buckwheat No. 2 (rice)	2.62	2.25	2.35	2.18	1.91	1.85	1.81
Buckwheat No. 3 (barley)	2.02	1.48	1.57	1.40	1.29	1.38	1.34
Total steam [1]	3.06	2.77	2.83	2.67	2.40	2.15	[3] 2.13
Total all sizes	6.29	6.34	6.62	6.92	6.85	6.83	[3] 7.10
Total, including Sullivan County:							
Lump	7.33	7.01	7.70	8.35	5.18	8.85	[3] 9.32
Broken	7.02	7.37	7.65	7.85	7.93	7.94	[3] 8.19
Egg	7.23	7.42	7.91	8.49	8.45	8.39	[3] 8.75
Stove	7.51	7.67	8.03	8.56	8.74	8.79	[3] 9.14
Chestnut	7.53	7.66	[2] 8.07	[2] 8.53	[2] 8.59	[2] 8.48	[2 3] 8.75
Pea	5.70	5.74	5.92	6.18	5.60	5.27	[3] 5.98
Total domestic	7.23	7.30	7.77	8.23	8.25	8.30	[3] 8.66

[1] Includes other small steam sizes.
[2] Includes range coal.
[3] The figures are based on complete reports of tonnage and value from all important producers, except one large company in the Wyoming region which reported the tonnage of each size but not the value. To round out the totals, estimates of the value of this company's shipments were made. For 1920 to 1925 they were taken at the average values for the same sizes reported by the other companies in the Wyoming region. For 1926 the same method was used for the small steam sizes of this company, but its shipments of buckwheat and larger sizes were taken at the average of its circular prices for the year. Had the same method of estimate been used in 1926 as in the earlier years the averages would have been as follows:

	Broken	Egg	Stove	Chestnut	Pea	Total domestic	Buckwheat No. 1	Total steam	All sizes
Wyoming	$7.92	$8.49	$8.92	$8.48	$5.87	$8.48	$2.42	$2.02	$7.00
All regions	8.15	8.66	9.09	8.69	5.98	8.60	2.39	1.88	6.78

TABLE 18A.—*Average sales realization per gross ton on anthracite shipments from breakers, by regions and sizes, 1920–1926*—Continued

Region and size of coal	1920	1921	1922	1923	1924	1925	1926
Total, including Sullivan County—Contd.							
Buckwheat No. 1	$3.76	$3.43	$3.56	$3.48	$2.94	$2.49	[3] $2.52
Buckwheat No. 2 (rice) [4]	2.69	2.27	2.37	2.23	1.93	1.84	1.78
Buckwheat No. 3 (barley)	1.94	1.45	1.57	1.41	1.30	1.32	1.32
Total steam [1]	3.22	2.75	2.77	2.64	2.25	2.00	[3] 1.94
Total all sizes	6.16	6.27	6.48	6.77	6.70	6.59	[3] 6.84

[1] Includes other small steam sizes. [3] See footnote on preceding page. [4] Includes bird's-eye coal.

AVERAGE VALUES OF SHIPMENTS, LOCAL SALES, AND COLLIERY FUEL

Table 19A shows by regions the average value per ton for all shipments, all local sales, and colliery fuel in each year from 1917 to 1926. The receipts from local sales average distinctly lower than those from shipments. In 1926 the shipments brought $6.76 and the local sales $4.95 or $1.81 less. These figures include the sales of dredges, but even when river coal is excluded a difference in value is observed. Shipments of breaker and washery coal in 1926 brought an average of $6.79 per ton and local sales, only $5.87. The difference is largely explained by the large proportion of pea coal in the local sales. (See Table 17A.)

TABLE 19A.—*Average value per gross ton of anthracite shipped, local sales, colliery fuel, and total production, by regions, 1917–1926* [1]

Year and region	Shipments	Local sales	Colliery fuel	Total	Year and region	Shipments	Local sales	Colliery fuel	Total
1917					1922				
Lehigh	$3.44	$2.20	$1.10	$3.18	Lehigh	$6.05	$3.97	$2.34	$5.56
Schuylkill	3.48	2.82	.72	3.08	Schuylkill	5.78	4.44	.78	4.98
Wyoming	3.48	3.03	.99	3.25	Wyoming	6.52	5.78	1.69	6.02
Sullivan County	2.95	3.44	1.03	2.85	Sullivan County	5.22	6.18	2.00	4.84
	3.47	2.85	.90	3.10		6.21	5.07	1.38	5.61
1918					1923				
Lehigh	4.01	2.68	1.36	3.71	Lehigh	6.36	3.80	1.77	5.84
Schuylkill	4.13	3.33	.91	3.67	Schuylkill	6.31	3.87	.72	5.63
Wyoming	4.18	3.39	1.45	3.92	Wyoming	6.81	5.92	1.43	6.40
Sullivan County	3.97	3.99	2.29	3.79	Sullivan County	6.81	6.56	2.60	6.73
	4.14	3.25	1.23	3.81		6.60	4.80	1.21	6.08
1919					1924				
Lehigh	4.86	3.37	1.80	4.51	Lehigh	6.54	4.53	1.68	6.03
Schuylkill	4.94	3.43	.85	4.31	Schuylkill	6.33	4.05	.45	5.57
Wyoming	5.21	4.55	1.55	4.85	Wyoming	6.81	6.14	.97	6.36
Sullivan County	4.63	4.70	2.29	4.36	Sullivan County	5.11	7.15	1.98	5.10
	5.08	3.98	1.32	4.64		6.63	5.15	.87	6.08
1920					1925				
Lehigh	5.88	3.29	1.94	5.34	Lehigh	6.24	4.49	1.57	5.79
Schuylkill	5.70	4.14	.90	4.99	Schuylkill	5.98	4.06	.42	5.22
Wyoming	6.15	5.17	1.80	5.71	Wyoming	6.78	6.01	1.12	6.37
Sullivan County	5.60	5.71	2.33	5.27	Sullivan County	5.49	6.93	1.85	5.05
	5.97	4.44	1.47	5.43		6.47	5.06	.88	5.94
1921					1926				
Lehigh	6.13	3.50	1.59	5.54	Lehigh	6.29	4.85	2.34	6.01
Schuylkill	6.03	4.19	.65	5.22	Schuylkill	6.41	3.98	.93	5.77
Wyoming	6.29	5.64	1.27	5.82	Wyoming	[2] 7.05	5.77	1.46	[2] 6.63
Sullivan County	6.21	6.20	2.30	5.53	Sullivan County	5.90	7.06	1.08	5.23
	6.20	4.75	1.08	5.60		[2] 6.76	4.95	1.35	[2] 6.29

[1] Value given for shipments is value at which coal left possession of producing company f. o. b. mines and does not include margins of separately incorporated selling companies.

[2] See Table 18A, footnote 3. Had the same method of computation been used as in earlier years the average value for shipments for the Wyoming region would have been $6.94 and for all regions, $6.70; and the average value of the total production for the Wyoming region would have been $6.54 and for all regions $6.24.

NUMBER OF OPERATIONS

Two hundred and thirty-nine breakers produced anthracite in 1926. This is much less than the total number of mines or workings, for a single breaker often handles the coal from several mines. In comparison with 1925 there was an increase of 1 in number of active breakers, and in comparison with 1923 a decrease of 18.

A decreasing number of washeries and dredges in operation reflects the decline in prices of steam coal in recent years and the depletion of the old culm banks and the more accessible river deposits. Only 38 washeries were active, a decrease of 44 since 1923. The number of river dredges reporting also shows a marked decrease.

TABLE 20A.—*Number of anthracite breakers, washeries, and dredges active, 1918–1926*

	1918	1919	1920	1921	1922	1923	1924	1925	1926
Lehigh:									
Breakers	34	34	36	33	32	33	33	32	33
Washeries	11	12	10	11	11	12	6	6	1
Dredges		3	3	1	4	3	3	2	1
	45	49	49	45	47	48	42	40	35
Schuylkill:									
Breakers	78	80	78	79	78	78	78	76	77
Washeries	25	24	19	17	24	26	13	7	11
Dredges	31	74	56	59	56	56	45	49	46
	134	178	153	155	158	160	136	132	134
Wyoming:									
Breakers	139	142	135	130	131	144	133	128	127
Washeries	40	42	33	27	34	44	22	22	26
Dredges	1	3	1	2	2	1	1	2	2
	180	187	169	159	167	189	156	152	155
Sullivan County: Breakers	3	3	3	3	2	2	3	2	2
Total breakers	254	259	252	245	243	257	247	238	239
Total washeries	76	78	62	55	69	82	41	35	38
Total dredges	32	80	60	62	62	60	49	53	49
Grand total	362	417	374	362	374	399	337	326	326

LABOR STATISTICS

In spite of the suspension the number of employees in the anthracite region increased in 1926. The total number of men and boys at work in the mines, dredges, and preparation plants, not including supervisory forces and office workers, was 165,386, the largest in any year since 1915. In comparison with 1923 this was a gain of 7,643. In the adjacent bituminous coal fields, during the period from 1923 to 1926, unemployment was widespread, many mines were closed, and the number of men at work decreased sharply.

In comparison with 1925 there was a net increase of 5,074 men (Table 21A), most of which occurred in the Wyoming region. It is also noteworthy that the additional men were put to work underground and that in the region as a whole the number employed on the surface decreased slightly.

The average number of days worked by the breakers was 245. Washeries averaged only 129 days and dredges 215 days.

TABLE 21A.—*Men employed and days worked in the anthracite field, by regions, 1925–26*

Region	Average number employed					Average number of days worked
	Surface	Underground		Total		
		Miners [1]	All others	Total		
1925						
Lehigh:						
Breakers	5,838	8,372	5,360	13,732	19,570	188
Washeries	(2)				(2)	(2)
Dredges	9				9	145
	5,847	8,372	5,360	13,732	19,579	187
Schuylkill:						
Breakers	14,710	22,770	12,503	35,273	49,983	177
Washeries	420				420	124
Dredges	342				342	195
	15,472	22,770	12,503	35,273	50,745	177
Wyoming:						
Breakers	17,933	47,351	23,797	71,148	89,081	184
Washeries	311				311	133
Dredges	7				7	185
	18,251	47,351	23,797	71,148	89,399	184
Sullivan County: Breakers	174	280	135	415	589	97
Total breakers	[3] 38,655	78,773	41,795	120,568	159,223	182
Total washeries	731				731	128
Total dredges	358				358	193
Grand total	39,744	78,773	41,795	120,568	160,312	182
1926						
Lehigh:						
Breakers	5,743	8,558	5,792	14,350	20,093	242
Washeries	33				33	240
Dredges	7				7	165
	5,783	8,558	5,792	14,350	20,133	242
Schuylkill:						
Breakers	13,885	22,586	12,880	35,466	49,351	238
Washeries	453				453	139
Dredges	334				334	216
	14,672	22,586	12,880	35,466	50,138	237
Wyoming:						
Breakers	18,059	50,490	25,453	75,943	94,002	249
Washeries	465				465	113
Dredges	2				2	110
	18,526	50,490	25,453	75,943	94,469	248
ullivan County: Breakers	174	329	143	472	646	207
Total breakers	[3] 37,861	81,963	44,268	126,231	164,092	245
Total washeries	951				951	129
Total dredges	343				343	215
Grand total	39,155	81,963	44,268	126,231	165,386	244

[1] Operators were requested to give number of "all miners (contract, consideration, and company) and their laborers."
[2] Included in breakers.
[3] Includes a comparatively small number of washery employees who could not be separated from breaker employees.

TABLE 22A.—*Strikes, suspensions, and lockouts in the anthracite region, 1922–1926*

	Lehigh	Schuylkill	Wyoming	Sullivan County	Total
1922					
Total number employed	20,180	49,722	86,205	742	156,849
Men on strike	19,066	41,893	80,753	730	142,442
Man days lost account strike	2,615,717	5,734,852	11,167,109	105,348	19,623,026
Average days lost:					
Per man employed	130	115	130	142	125
Per man on strike	137	137	138	144	138
1923					
Total number employed	20,639	49,350	86,978	776	157,743
Men on strike	18,593	43,524	72,772	696	135,585
Man days lost account strike	354,830	805,640	1,456,364	12,584	2,629,418
Average days lost:					
Per man employed	17	16	17	16	17
Per man on strike	19	19	20	18	19
1924					
Total number employed	20,331	50,456	88,504	718	160,009
Men on strike	10,145	12,333	48,795	----------	71,273
Man days lost account strike	151,243	86,429	905,958	----------	1,143,630
Average days lost:					
Per man employed	7	2	10	----------	7
Per man on strike	15	7	19	----------	16
1925					
Total number employed	19,579	50,745	89,399	589	160,312
Men on strike	18,751	45,715	82,876	586	147,928
Man days lost account strike	1,863,605	4,675,143	8,661,264	69,494	15,269,506
Average days lost:					
Per man employed	95	92	97	118	95
Per man on strike	99	102	105	119	103
1926					
Total number employed	20,133	50,138	94,469	646	165,386
Men on strike	17,074	44,309	83,381	612	145,376
Man days lost account strike	723,550	1,825,482	3,415,913	25,532	5,990,477
Average days lost:					
Per man employed	36	36	36	40	36
Per man on strike	42	41	41	42	41

METHODS OF MINING

Natural conditions in the anthracite mines have not favored the introduction of cutting machines, and out of 71,839,920 tons of fresh-mined coal produced in 1926 only 831,183 tons, or 1.1 per cent, was cut by machine. (Table 23A.) The use of cutting machines is almost entirely confined to the Wyoming region and Sullivan County, where the beds are less steeply inclined.

On the contrary stripping operations are most important in the Lehigh and Schuylkill regions. In 1926 a total of 2,144,068 tons was produced in pits employing 99 shovels. (Table 24A.)

TABLE 23A.—*Anthracite mined by machines, 1924–1926*

Region	1924		1925		1926	
	Number of machines	Gross tons	Number of machines	Gross tons	Number of machines	Gross tons
Schuylkill	----------	----------	1	19,063	2	4,032
Wyoming	193	1,200,103	139	764,204	74	732,897
Sullivan County	19	71,222	19	57,080	14	94,254
	212	1,271,325	159	840,347	90	831,183

TABLE 24A.—*Anthracite recovered from steam-shovel strip pits, 1924–1926*

Region	1924		1925		1926	
	Number of shovels	Gross tons	Number of shovels	Gross tons	Number of shovels	Gross tons
Lehigh	37	963,885	52	831,181	43	1,072,392
Schuylkill	42	580,635	38	546,678	40	818,443
Wyoming	16	121,263	7	31,496	16	253,233
	95	1,665,783	97	1,409,355	99	2,144,068

DREDGE OPERATIONS

In 1926, 49 dredges reported to the Bureau of Mines a production of 816,754 tons, valued at $828,398. Definite reports were received from all dredge operators on its lists, but the bureau can not guarantee that its present lists are complete because a systematic field canvass of the dredge industry has not been made since 1920, although meanwhile the names of certain new operations have been obtained.

The "river coal" consists chiefly of sizes equivalent to buckwheat No. 3 and boiler. Much of it is sold for steam raising at near-by points, and in recent years it has been widely used for househeating in Harrisburg, York, Sunbury, and other cities on the Susquehanna River, for which purpose it is burned under forced draft on specially designed grates. Of the total production, 456,527 tons was sold locally and 354,947 tons shipped away. The consumption as fuel by the dredge operators themselves was 5,280 tons.

The prices obtained for dredge coal have declined since 1920 but in the last four years have averaged about $1 per gross ton. The average receipts per ton on all coal sold, including local sales as well as shipments, have been as follows:

1920	$1.30	1924	$0.94
1921	1.17	1925	1.02
1922	1.23	1926	1.01
1923	.95		

In most of the tables of this report the output of the dredges has been apportioned among the Schuylkill, Lehigh, and Wyoming regions, but this apportionment is necessarily arbitrary, for most of the dredges are working some distance downstream from the mines. The recapitulation, by rivers, in Table 25A will indicate more clearly where the dredge coal is recovered. By far the greater part is taken from the Susquehanna and its tributaries.

In the winter dredging is handicapped by cold weather. The seasonal nature of the industry is shown by Table 26A, which gives the number of employees in each month.

TABLE 25A.—*Anthracite produced by dredges, by rivers, 1925 and 1926*

River (including tributaries)	Number of dredges	Gross tons	Value	River (including tributaries)	Number of dredges	Gross tons	Value
1925				1926			
Lehigh	2	88,941	$86,983	Lehigh	1	52,272	$61,743
Schuylkill	13	155,035	190,362	Schuylkill	10	117,548	153,127
Susquehanna	38	662,906	651,947	Susquehanna	38	646,934	613,528
	53	906,882	929,292		49	816,754	828,398

TABLE 26A.—*Number of employees on pay rolls of anthracite-dredge operations on the 1st day of each month, 1924–1926*

Month	1924	1925	1926	Month	1924	1925	1926
January	132	114	182	July	429	376	433
February	167	125	191	August	389	367	419
March	217	234	248	September	377	384	399
April	317	325	344	October	366	394	389
May	419	356	412	November	284	352	336
June	429	368	441	December	170	247	250

COKE AND BY-PRODUCTS

By F. G. Tryon, H. O. Rogers, and H. L. Bennit

ACKNOWLEDGMENTS

The statistics in this report are obtained by the voluntary cooperation of the producers and carriers of coke. Special acknowledgment is made of the courtesy of operators of by-product coke plants in supplying monthly reports of production and stocks. The bureau is also under deep obligation to the auditors of the coke-carrying railroads for weekly reports of carloads of beehive coke loaded and to the United States Engineer Office for figures of coke shipped over the Monongahela River and other waterways. To these and all others who have supplied information cordial thanks are extended.

REVIEW OF THE COKE TRADE IN 1926

Three influences dominated the coke market in 1926. Sustained activity in the iron and steel and related industries stimulated the consumption of metallurgical coke, the anthracite suspension of 1925–26 created an unprecedented demand for domestic coke, and in the fall a flurry in coal prices associated with the British miners' strike caused a sharp advance in the spot price of coke.

The activity of the metal trades in 1926 was shown by the record production of 48,293,763 gross tons of steel and by the fact that the shipments of pig iron from blast furnaces—38,181,053 gross tons—fell but little below the high levels of 1916, 1917, 1918, and 1923. The increased demand for metallurgical coke was reflected in an increase in the average receipts from sales of by-product furnace coke, which rose from $5.73 in 1925 to $6.25 in 1926.

The influence of the anthracite suspension was chiefly felt in the first quarter of the year. (See fig. 17.) The suspension was entering its fifth month as the year began, and it continued until February 18. Beehive as well as by-product coke was drawn upon to replace the deficit in anthracite, and as a result spot prices in the Connellsville region in January and February touched the highest levels recorded since the winter of 1922–23. Stocks of coke at a group of 21 by-product plants producing coke suitable for domestic use fell from 865,000 tons on September 1, 1925, when the strike began, to 53,000 tons on April 1, 1926. (Fig. 18.) After the agreement between anthracite miners and operators was reached prices receded sharply, and thereafter market quotations continued to decline until they approximated those prevailing in the preceding year.

The influence of the British strike upon the coke market was chiefly indirect. No marked change occurred in the quantity of coke exported; but the heavy exports of raw coal, combining with other

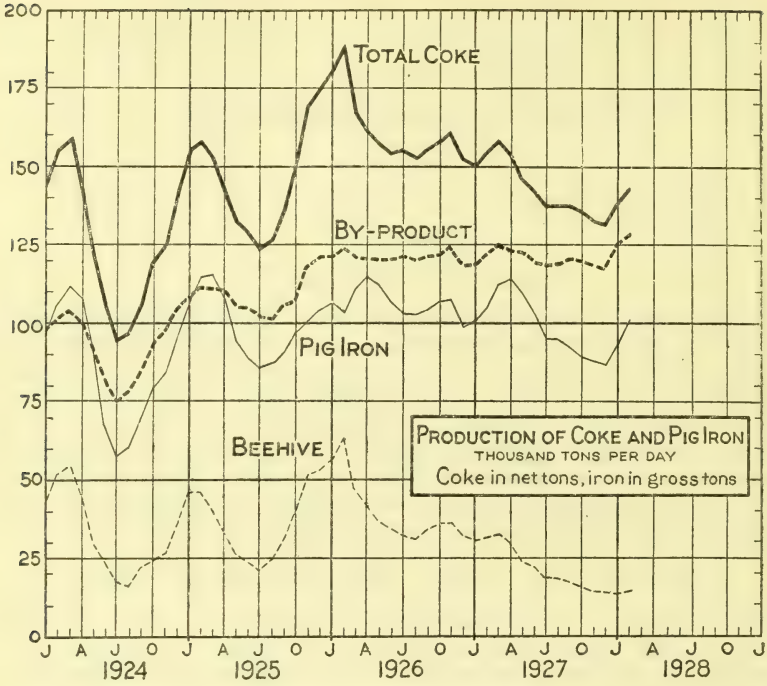

FIGURE 17.—Average daily production of beehive and by-product coke and of pig iron, by months

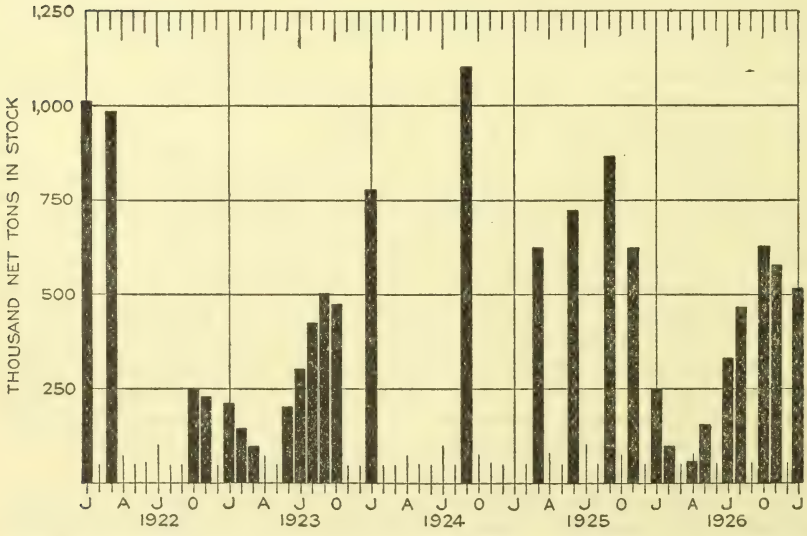

FIGURE 18.—Stocks of unsold coke on hand at a group of 21 by-product plants making coke suitable for domestic use and supplying gas for city distribution

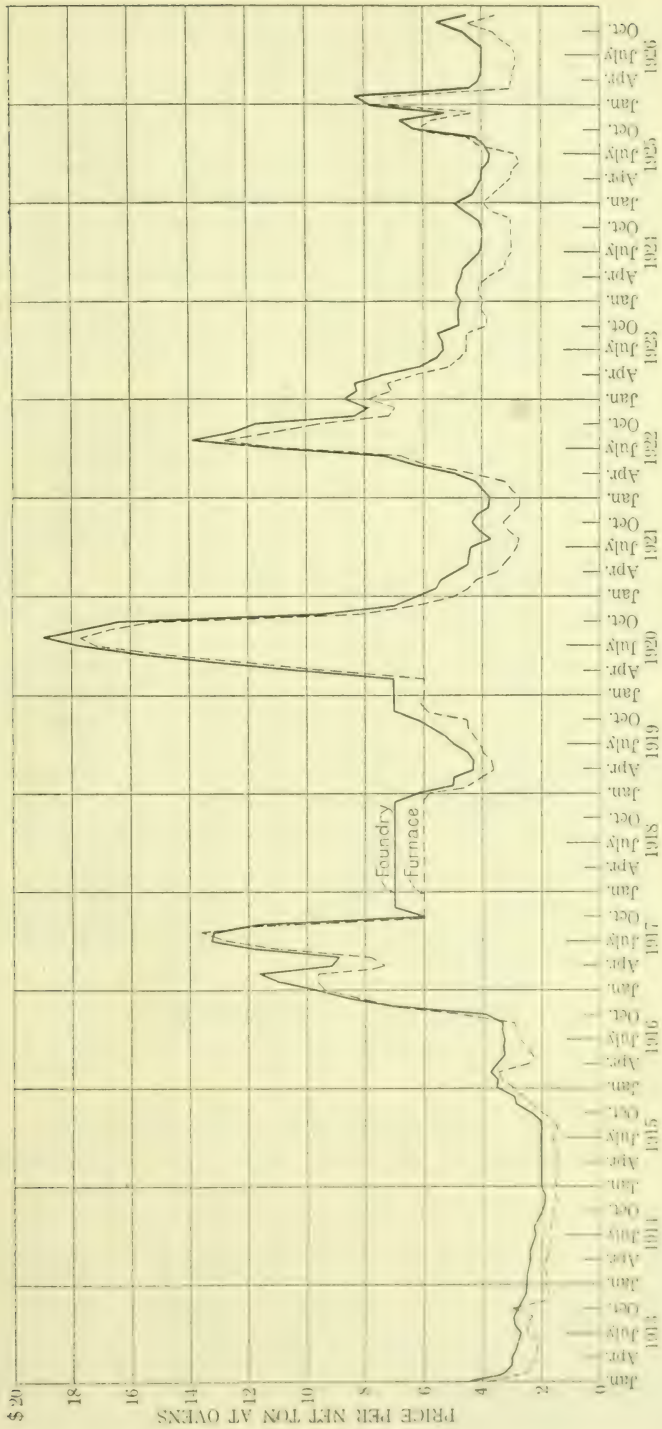

FIGURE 19.—Average monthly prices of spot or prompt Connellsville coke at ovens, as quoted by Iron Age

influences in the internal coal trade of the country, produced a sharp rise in spot prices of coal which was reflected in the prices of Connellsville coke. The British strike began in May, but the effect on coke prices was not apparent until late July, when the spot market stiffened perceptibly. In the late fall there was a general advance in miners' wages in the nonunion fields of the East, for the rising prices led to the reopening of many mines and created a sudden demand for labor. This move occasioned an increase of between 75 and 85 cents a ton in coke prices, an increase which not only affected current market purchasers but also consumers who were protected by contracts that carried the wage clause. (See fig. 19.) In comparison with the levels attained during the anthracite shortage, however, the advances in price were small and after the settlement of the British strike the market suffered a decided relapse, and the year ended with prices not far from normal.

In total production of coke 1926 fell only slightly behind the high record established in 1923 and exceeded the peak year of the war period by 387,165 tons. The total of all coke—beehive and by-product—produced during the year amounted to 56,865,537 net tons, an increase of 5,598,594 tons, or 11 per cent, when compared with the output of the preceding year. By-product production did in fact set a new high mark with a total of 44,376,586 tons, as against the previous record of 39,912,159 tons in 1925. The output of beehive coke also showed an increase when compared with 1925 and amounted to 12,488,951 tons, a gain of 1,134,167 tons.

The year 1926 was further notable for the high percentage of the output coming from by-product ovens. As late as 1918 beehive coke had been the principal source of supply. In 1926, 78 per cent of the total was by-product coke and 22 per cent beehive coke. Although the beehive ovens produced more coke than in 1925 they contributed a slightly lower percentage of the total. Indeed, in spite of the active demand for coke in 1926, the proportion supplied by beehive ovens was scarcely greater than in 1921, a year of acute depression. These shifts indicate the degree to which the beehive branch of the industry is becoming an auxiliary source of supply, whose chief function is to furnish the surplus requirements of the metallurgical industry in times of most active demand.

STATISTICAL SUMMARY

The principal statistical facts of the coke industry in 1926 are presented in Table 1.

TABLE 1.—*Salient statistics of the coke industry in 1926*

	By-product	Beehive	Total
Coke produced:			
Quantity.....net tons..	44, 376, 586	12, 488, 951	56, 865, 537
Value.....	$250, 748, 533	$57, 024, 869	$307, 773, 402
Screenings and breeze produced:			
Quantity.....net tons..	4, 183, 453	218, 342	4, 401, 795
Value.....	$9, 233, 229	$648, 193	$9, 881, 422
Coal charged into ovens:			
Quantity.....net tons..	63, 646, 610	19, 224, 500	82, 871, 110
Value.....	$247, 170, 284	$38, 541, 691	$285, 711, 975
Average value.....	$3. 88	$2. 00	$3. 45
Average yield in per cent of coal charged:			
Coke.....	69. 7	65. 0	68. 6
Breeze (at plants actually recovering).....	6. 6	2. 8	6. 2

TABLE 1.—*Salient statistics of the coke industry in 1926*—Continued

	By-product	Beehive	Total
Ovens:			
In existence Jan. 1	11,290	57,587	68,877
In existence Dec. 31	11,716	52,558	64,274
Dismantled during year	183	5,018	5,201
In course of construction Dec. 31	978		978
Daily coke capacity of ovens in existence Dec. 31—net tons	144,290	(1)	(1)
Disposal of coke :			
Used by operator in blast furnace or affiliated works—			
Quantity—net tons	31,334,305	1,575,039	32,909,344
Value	$160,606,129	$7,148,961	$167,755,090
Sold for furnace use to affiliated corporations—			
Quantity—net tons	2,127,176	4,260,028	6,387,204
Value	$10,955,119	$20,306,453	$31,261,572
Merchant sales of furnace coke—			
Quantity—net tons	1,566,980	4,156,032	5,723,012
Value	$9,800,299	$16,384,006	$26,184,305
Sold for foundry use—			
Quantity—net tons	2,168,017	1,163,660	3,331,677
Value	$16,836,376	$5,967,936	$22,804,312
Sold for domestic use—			
Quantity—net tons	5,056,568	386,045	5,442,613
Value	$37,567,659	$2,677,741	$40,245,400
Sold for industrial and other use—			
Quantity—net tons	1,662,837	963,797	2,626,634
Value	$12,285,212	$4,638,542	$16,923,754
Disposal of screenings and breeze:			
Used by operator—			
Quantity—net tons	3,085,770	52,314	3,138,084
Value	$5,595,796	$65,034	$5,660,830
Sold—			
Quantity—net tons	936,292	43,516	979,808
Value	$3,281,676	$167,089	$3,448,765
Average receipts per ton sold:			
Furnace coke (merchant sales)	$6.25	$3.94	$4.58
Foundry coke	$7.77	$5.13	$6.84
Domestic coke	$7.43	$6.94	$7.39
Industrial and other coke	$7.39	$4.81	$6.44
Screenings and breeze	$3.50	$3.84	$3.52
By-products produced:			
Gas—M cubic feet	706,681,828		706,681,828
Wasted—per cent	1.7		1.7
Burned in coking process—do	42.0		42.0
Surplus sold or used—do	56.3		56.3
Tar—gallons	529,486,374		529,486,374
Ammonium sulphate or equivalent—pounds	1,381,952,369		1,381,952,369
Crude light oil—gallons	164,059,552		164,059,552
Yield of by-products per ton of coal:			
Gas—M cubic feet	11.1		11.1
Tar—gallons	8.3		8.3
Ammonium sulphate or equivalent—pounds	21.7		21.7
Crude light oil—gallons	2.8		2.8
Value of by-products sold:			
Gas (surplus)	$64,686,800		$64,686,800
Tar	$14,103,760		$14,103,760
Amonium sulphate or equivalent	$28,128,203		$28,128,203
Crude light oil and derivatives	$27,304,976		$27,304,976
Other by-products	$246,030		$246,030
Total value of coke, breeze, and by-products	$394,451,531	$57,673,062	$452,124,593

[1] Data not available.

SCOPE AND METHOD OF REPORT

DEFINITIONS OF TERMS USED IN STATISTICAL TABLES

The standard unit of measurement in the coke industry in the United States is the short or net ton of 2,000 pounds; unless other notation is made it is the unit employed throughout this chapter.

The term "coke" does not include breeze or fine coke screenings, because operators in general, especially those in the beehive industry, do not regard this fine material as properly so classified. No effort has been made to define accurately the limitation as to size between coke and breeze. Each operator has followed his own regular practice in reporting his output of fine material to the Bureau of Mines. It

is probably safe to say, however, that coke breeze and screenings correspond closely in size to the anthracite usually classified as steam sizes; in other words, they include material smaller than pea coal.

For reasons explained in a later section the statistics of by-product coke in this chapter cover the operations of all by-product coke ovens, including those installed and operated by public utilities engaged primarily in manufacturing gas for city supply.

ACCOUNTING PRACTICES OF COKE OPERATORS THAT AFFECT STATISTICS

The term "value" as applied to coke in this report means the value at the ovens. For the part of the output that is sold the value is obviously the amount received for the coke f. o. b. ovens, but a considerable proportion of the coke produced in the United States is made in ovens operated by large corporations that not only mine the coal and make the coke but also have blast furnaces and steel mills that consume the entire product of the ovens. Under such conditions fixing a value upon the coke and upon the coal consumed in making it is purely arbitrary. Some corporations charge the coke to the furnace department at cost; others add a percentage of profit or base the reported value on what the coke would cost if purchased.

These differences in accounting practice also affect the relative proportions of the output reported as "sold" and as "used by producer." Between the blast furnaces, which are the largest users of coke, and the coke plants there is a close business relation which at many plants amounts to identity of ownership. Among such affiliated interests the line between sales and interdepartmental transfers is difficult to draw, and a large part of the furnace coke reported as sold actually goes to iron furnaces that are in some way connected with the coke companies. (See Tables 38 and 39.)

COKE-PRODUCING INDUSTRIES

In the United States coke is produced by a group of five different industries. In addition to that produced in the familiar beehive and by-product ovens, coke is obtained in the refining of petroleum, in the manufacture of coal gas, and in the refining of coal tar. The coke produced, however, differs greatly in character, and the problems affecting each of these industries are separate and distinct.

Petroleum coke.—When the refining of crude oil is conducted at temperatures above that of decomposition an ultimate residue is left known as petroleum coke. Its physical properties are much like those of coke made from coal, except that it is finer in texture, lacks the strength required for metallurgical coke, and is extraordinarily low in ash, probably averaging not more than 1.5 per cent. In 1926 the total production of petroleum coke amounted to 995,308 net tons, of which about two-thirds came from cracking stills and one-third from coking stills. Of the total quantity produced 408,000 tons was used about the refineries as boiler fuel. Because of its extremely low ash content petroleum coke is in demand as a source of comparatively pure carbon and is widely used in the manufacture of carbon electrodes, electric furnace resisters, and dry cells. The rest of the output is disposed of locally, either for domestic fuel or for miscellaneous industrial purposes. According to figures collected by the

Bureau of Mines, the production of petroleum coke in recent years has been as follows:

Petroleum coke produced and in stock in the United States, 1917–1926, in net tons

Year	Production	Stock at end of year	Year	Production	Stock at end of year
1917	539,366	7,585	1922	707,064	35,722
1918	559,663	22,605	1923	672,526	26,264
1919	603,459	21,146	1924	761,095	97,844
1920	576,613	31,469	1925	990,991	238,403
1921	604,465	74,508	1926	995,308	290,582

Gas-house coke.—In the manufacture of coal gas, as in petroleum refining, the coke obtained is a by-product. The process of carbonization is essentially the same as that in by-product ovens, although the type of oven is different. The coals used are selected for the quality and volume of the gas evolved rather than for their coking properties, and the coke formed is too soft and friable, too high in volatile matter, and too irregular in quality for foundry or furnace use. It is, however, suitable for the manufacture of water gas, a fact that has led many gas companies to combine water gas and coal gas in the same plant. In recent years about one-half the gas-house coke produced has been used for making water gas, for heating retorts, or for boiler fuel about the plant where it was produced, the other half being sold largely for domestic fuel. Even for house heating, however, it commands a lower price than by-product coke especially prepared for domestic use.

Coal-tar coke.—Recent developments have made available another form of coke—that derived from coal-tar pitch. The product, which is known as pitch coke, is not to be confused with the tar-still coke, sometimes obtained as the end product of the distillation of tar. Tar-still coke is too soft for metallurgical use and is of relatively small value; for this and other reasons it is common practice to run the pitch out of the stills before it reaches the stage of coking. By introducing the pitch into a coke oven, however, and by coking it an excellent metallurgical coke may be produced, unusually hard and firm, containing only 0.3 per cent of ash, and very low in sulphur. Pitch coke has proved itself well adapted to foundry use and often commands a premium over coke made from coal. The manufacture of pitch coke is established commercially but has not yet reached the stage where publication of statistics on the subject is expedient.

Beehive and by-product coke.—Neither petroleum coke nor gas-house coke is adapted for metallurgical purposes, the use that consumes the great bulk of all coke produced and the production of coal-tar coke is so limited as to be of small importance. Practically, therefore, the coke trade is concerned only with beehive and by-product coke, and the statistics of this report are confined to these two types. Although their products are interchangeable there are fundamental differences between the beehive and by-product industries which must be kept in mind when the tables in this chapter are examined. The competitive relations between the beehive and by-product industries have been discussed in previous reports of this series and need not be treated here. (See "Coke and By-products in 1924," pp.

666–667.) Market conditions continue to foster the development of by-product coking, and the manufacture of beehive coke assumes more and more the character of an auxiliary agency called upon to furnish only the peak requirements of the metallurgical industry in times of active business.

By-product ovens operated by city gas companies included.—Between the by-product coke and the coal-gas industries the line is increasingly difficult to draw. Adaptation of the by-product coke oven to the needs of city-gas manufacture has led a number of gas companies to install batteries of by-product ovens to supplement or even replace their coal or water gas plants. From the point of view of ownership and accounting these installations are a part of the gas utility system, and the Bureau of the Census therefore groups them with the manufactured-gas industry under the title "Gas manufactured, illuminating and heating."

But from other points of view these installations belong to the by-product coke industry. The coke they produce is superior to gas-house coke. In the practical operation of a by-product coke plant the fact that the gas may be distributed through city mains is of less consequence than the fact that the coke must be marketed for foundry, furnace, or household use. Considered with reference to oven design and the technique of manufacture, and still more with reference to the supply and demand for coke, they should be included with other by-product coke plants, and they are so included in the statistics published by the Bureau of Mines.

These differences in classification are followed advisedly by the Bureau of the Census and the Bureau of Mines after consultation with leaders of the gas and coke industries, and the two offices have collaborated in the collection and analysis of the statistics. In order to enable the reader to reconcile the two sets of figures and to ascertain the total production of gas and coke from all sources without duplication, tables are given on pages 672 to 675 of this report in which the production of those by-product ovens operated by city gas companies is shown separately.

TABLE 2.—*Summary of coke produced, value, number of ovens, coal charged, and average yield, by States, 1925 and 1926*

[Exclusive of screenings and breeze]

State	By-product							Beehive						Total	
	Plants	Ovens		Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens	Ovens	Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens		Coke produced (net tons)	Value of coke at ovens
		Built	Under construction Dec. 31				Total					Total	Per ton		
1925															
Alabama	8	1,276	.....	6,516,689	70.3	4,582,153	$16,347,971	$3.57	4,961	137,106	64.4	88,328	$453,870	$5.14	4,670,481	$16,801,841
Colorado	1	120	.....	706,948	69.3	489,657	(1)	(1)	1,681	239,004	64.8	154,824	(1)	(1)	644,481	(1)
Georgia									151	8,651	56.9	4,925	38,464	7.81	4,925	38,464
Illinois	7	849	.....	4,224,420	71.3	3,011,497	22,568,845	7.49	.....	.....	.....	.....	.....	.....	3,011,497	22,568,845
Indiana	7	1,177	212	6,866,855	74.9	5,141,940	36,635,104	7.12	.....	.....	.....	.....	.....	.....	5,141,940	36,635,104
Kentucky	1	(2)	.....	(2)	(2)	(2)	(2)	(2)	795	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Maryland	1	300	.....	1,383,344	73.4	1,019,209	(1)	(1)	.....	.....	.....	.....	.....	.....	1,019,209	(1)
Massachusetts	2	419	.....	797,699	67.1	535,302	(1)	(1)	.....	.....	.....	.....	.....	.....	535,302	(1)
Michigan	5	420	2	2,450,275	71.5	1,751,118	11,708,519	6.69	.....	.....	.....	.....	.....	.....	1,751,118	11,708,519
Minnesota	3	220	.....	791,992	65.4	518,355	4,992,024	9.63	.....	.....	.....	.....	.....	.....	518,355	4,992,024
Missouri	1	(2)	.....	(2)	(2)	(2)	(2)	(2)	.....	.....	.....	.....	.....	.....	(2)	(2)
New Jersey	2	206	.....	1,242,275	72.8	903,997	(1)	(1)	.....	.....	.....	.....	.....	.....	903,997	(1)
New Mexico									1,030	(2)	(2)	(2)	(2)	(2)	(2)	(2)
New York	6	506	155	3,074,405	72.2	2,219,409	12,968,066	5.84	.....	.....	.....	.....	.....	.....	2,219,409	12,968,066
Ohio	14	1,689	.....	10,336,068	68.7	7,105,129	34,190,691	4.81	204	240,828	64.8	156,058	(1)	(1)	7,261,187	(1)
Oklahoma									300	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	12	3,220	60	14,679,836	67.1	9,853,262	34,518,863	3.50	34,668	14,572,282	65.7	9,574,341	41,875,615	4.37	19,427,603	76,394,478
Rhode Island	1	(2)	.....	(2)	(2)	(2)	(2)	(2)	.....	.....	.....	.....	.....	.....	(2)	(2)
Tennessee	1	24	.....	125,860	70.6	88,879	471,059	5.30	1,675	200,373	63.7	127,609	690,041	5.40	216,488	1,161,100
Utah	1	33	.....	316,285	53.2	168,150	(1)	(1)	819	247,473	59.0	146,009	1,240,256	8.49	314,159	(1)
Virginia									3,124	661,193	63.8	421,691	1,901,623	4.51	421,691	1,901,623
Washington	1	20	.....	68,655	59.3	40,757	289,782	7.11	332	62,644	61.5	38,500	327,483	8.51	79,257	617,265
West Virginia	4	311	.....	1,526,820	69.2	1,055,992	4,479,866	4.24	7,847	804,055	60.9	490,040	2,168,879	4.43	1,546,032	6,648,745
Wisconsin	2	(2)	.....	(2)	(2)	(2)	(2)	(2)	.....	.....	.....	.....	.....	.....	(2)	(2)
Combined States	.....	500	.....	2,001,165	71.3	1,427,353	10,555,681	7.39	.....	248,972	61.2	152,459	1,004,350	6.59	1,579,812	11,560,031
Undistributed	.....	.....	.....	.....	.....	.....	21,101,100	6.77	.....	.....	.....	.....	2,030,985	6.53	.....	58,563,032
	80	11,290	429	57,109,651	69.9	39,912,159	210,827,571	5.28	57,587	17,422,581	65.2	11,354,784	51,731,566	4.56	51,266,943	262,559,137

[1] Included under "Undistributed."

[2] Included under "Combined States."

TABLE 2.—*Summary of coke produced, value, number of ovens, coal charged, and average yield, by States, 1925 and 1926*—Continued

State	By-product								Beehive						Total	
	Plants	Ovens		Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens		Ovens	Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens		Coke produced (net tons)	Value of coke at ovens
		Built	Under construction Dec. 31				Total	Per ton					Total	Per ton		
1926																
Alabama	8	1,276	112	6,799,773	70.3	4,779,986	$16,823,492	$3.52	1,831	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Colorado	1	120		859,725	69.0	592,939	(1)	(1)	1,527	307,011	64.2	197,179	(1)	(1)	790,118	(1)
Georgia									151	5,125	59.7	3,059	$23,034	$7.53	3,059	$23,034
Illinois	7	849		4,712,342	70.8	3,336,962	25,050,474	7.51							3,336,962	25,050,474
Indiana	7	1,394	40	7,994,696	74.9	5,990,344	44,143,059	7.37							5,990,344	44,143,059
Kentucky	1	(2)		(2)	(2)	(2)	(2)	(2)	763	249,952	59.0	147,540	600,169	4.07	(2)	(2)
Maryland	1	300	60	1,534,021	73.1	1,120,610	(1)	(1)							1,120,610	(1)
Massachusetts	2	466	15	874,053	65.6	573,748	(1)	(1)							573,748	(1)
Michigan	5	420	120	2,522,841	72.4	1,826,638	12,713,083	6.96							1,826,638	12,713,083
Minnesota	3	220		903,041	68.6	619,905	6,014,738	9.70							619,905	6,014,738
Missouri	1	(2)		(2)	(2)	(2)	(2)	(2)							(2)	(2)
New Jersey	2	207		1,260,372	72.5	913,250	(1)	(1)							913,250	(1)
New Mexico									584	(2)	(2)	(2)	(2)	(2)	(2)	(2)
New York	8	661	117	3,950,026	71.6	2,827,805	17,455,226	6.17							2,827,805	17,455,226
Ohio	14	1,689	89	10,962,723	68.9	7,547,836	40,344,524	5.35	204	125,883	67.5	84,970	(1)	(1)	7,632,806	(1)
Oklahoma									300							
Pennsylvania	12	3,126	425	16,895,070	66.3	11,200,624	48,722,935	4.35	34,375	16,344,439	65.6	10,722,352	47,595,184	4.44	21,922,976	96,318,119
Rhode Island	1	(2)		(2)	(2)	(2)	(2)	(2)							(2)	(2)
Tennessee	1	24		165,065	71.9	118,624	628,482	5.30	1,605	215,647	56.8	122,410	605,017	4.94	241,034	1,233,499
Utah	1	33		326,544	56.6	184,756	(1)	(1)	819	203,750	59.6	121,475	1,033,284	8.51	306,231	(1)
Virginia									2,914	599,943	61.8	370,983	1,716,716	4.63	370,983	1,716,716
Washington	1	20		67,544	63.0	42,584	303,624	7.13	332	39,265	62.9	24,702	214,429	8.68	67,286	518,053
West Virginia	4	411		1,632,790	69.2	1,129,862	4,265,884	3.78	7,153	957,029	61.0	583,599	2,652,219	4.54	1,713,461	6,918,103
Wisconsin	2	(2)		(2)	(2)	(2)	(2)	(2)							(2)	(2)
Combined States		500		2,185,984	71.8	1,570,113	11,621,482	7.40		176,456	62.7	110,682	730,590	6.60	6,608,321	29,775,733
Undistributed							22,661,530	6.69					1,854,227	6.57		65,893,565
	82	11,716	978	63,646,610	69.7	44,376,586	250,748,533	5.65	52,558	19,224,500	65.0	12,488,951	57,024,869	4.57	56,865,537	307,773,402

[1] Included under "Undistributed."

[2] Included under "Combined States."

COKE AND COKE BREEZE

GROWTH OF INDUSTRY

TABLE 3.—*By-product and beehive coke produced in the United States, 1880–1926*

Year	By-product	Beehive	Total	Year	By-product	Beehive	Total
1880		3,338,300	3,338,300	1904	2,608,229	21,052,877	23,661,106
1881		4,113,760	4,113,760	1905	3,462,348	28,768,781	32,231,129
1882		4,793,321	4,793,321	1906	4,558,127	31,843,090	36,401,217
1883		5,464,721	5,464,721	1907	5,607,899	35,171,665	40,779,564
1884		4,873,805	4,873,805	1908	4,201,226	21,832,292	26,033,518
1885		5,106,696	5,106,696	1909	6,254,644	33,060,421	39,315,065
1886		6,845,369	6,845,369	1910	7,138,734	34,570,076	41,708,810
1887		7,611,705	7,611,705	1911	7,847,845	27,703,644	35,551,489
1888		8,540,030	8,540,030	1912	11,115,164	32,868,435	43,983,599
1889		10,258,022	10,258,022	1913	12,714,700	33,584,830	46,299,530
1890		11,508,021	11,508,021	1914	11,219,943	23,335,971	34,555,914
1891		10,352,688	10,352,688	1915	14,072,895	27,508,255	41,581,150
1892		12,010,829	12,010,829	1916	19,069,361	35,464,224	54,533,585
1893	12,850	9,464,730	9,477,580	1917	22,439,280	33,167,548	55,606,828
1894	16,500	9,187,132	9,203,632	1918	25,997,580	30,480,792	56,478,372
1895	18,521	13,315,193	13,333,714	1919	25,137,621	19,042,936	44,180,557
1896	83,038	11,705,735	11,788,773	1920	30,833,951	20,511,092	51,345,043
1897	261,912	13,027,072	13,288,984	1921	19,749,580	5,538,042	25,287,622
1898	294,445	15,752,764	16,047,209	1922	28,550,545	8,573,467	37,124,012
1899	906,534	18,762,035	19,668,569	1923	37,597,664	19,379,870	56,977,534
1900	1,075,727	19,457,621	20,533,348	1924	33,983,568	10,286,037	44,269,605
1901	1,179,900	20,615,983	21,795,883	1925	39,912,159	11,354,784	51,266,943
1902	1,403,588	23,998,142	25,401,730	1926	44,376,586	12,488,951	56,865,537
1903	1,882,394	23,391,887	25,274,281				

TABLE 4.—*Statistical summary of the manufacture of coke in the United States, 1916–1926*

Year	Plants	Ovens in existence	Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens [1]	
						Total	Per ton
1916	499	98,864	81,609,460	66.8	54,533,585	$170,841,197	$3.13
1917	482	95,896	83,752,371	66.4	55,606,828	298,243,017	5.36
1918	466	93,914	85,028,018	66.4	56,478,372	382,324,368	6.77
1919	464	92,939	65,587,918	67.4	44,180,557	258,339,740	5.85
1920	416	86,179	76,190,832	67.4	51,345,043	475,981,215	9.27
1921	374	77,156	37,188,557	68.0	25,287,622	147,673,095	5.84
1922	366	75,170	54,338,538	68.3	37,124,012	238,313,323	6.42
1923	361	73,505	84,359,943	67.5	56,977,534	373,496,898	6.56
1924	347	71,845	64,975,649	68.1	44,269,605	244,041,561	5.51
1925	347	68,877	74,532,232	68.8	51,266,943	262,559,137	5.12
1926	332	64,274	82,871,110	68.6	56,865,537	307,773,402	5.41

Year	By-product coke				Beehive coke			
	Quantity		Value [1]		Quantity		Value [1]	
	Net tons	Per cent	Dollars	Per cent	Net tons	Per cent	Dollars	Per cent
1916	19,069,361	35.0	75,373,070	44.1	35,464,224	65.0	95,468,127	55.9
1917	22,439,280	40.4	138,643,153	46.5	33,167,548	59.6	159,599,864	53.5
1918	25,997,580	46.0	193,018,785	50.5	30,480,792	54.0	189,305,583	49.5
1919	25,137,621	56.9	160,244,768	62.0	19,042,936	43.1	98,094,972	38.0
1920	30,833,951	60.0	313,028,732	65.8	20,511,092	40.0	162,952,483	34.2
1921	19,749,580	78.1	117,506,646	79.6	5,538,042	21.9	30,166,449	20.4
1922	28,550,545	76.9	188,276,767	79.0	8,573,467	23.1	50,036,556	21.0
1923	37,597,664	66.0	257,591,318	69.0	19,379,870	34.0	115,905,580	31.0
1924	33,983,568	76.8	195,690,009	80.2	10,286,037	23.2	48,351,552	19.8
1925	39,912,159	77.9	210,827,571	80.3	11,354,784	22.1	51,731,566	19.7
1926	44,376,586	78.0	250,748,533	81.5	12,488,951	22.0	57,024,869	18.5

[1] Includes operators' statements of the value of coke consumed by them in associated enterprises but not sold, except that in 1918 and 1920 the value of such coke was estimated for each State at the average value or that State of the part of the product reported sold.

MONTHLY AND WEEKLY PRODUCTION

Figures for monthly and weekly production of coke are given in Tables 5 to 10. The monthly statistics of by-product coke are based upon reports from the producers themselves. From 1917 to date the reports are practically complete, and for the five years earlier (1912 to 1916) monthly data were obtained from the great majority of the producers and estimates were included for the few plants remaining. No data on the monthly production of by-product coke prior to 1912 are available.

The current statistics of beehive coke are estimates based upon reports of cars of coke loaded for shipment by the principal coke-carrying roads. The reports are now received weekly and are here shown adjusted to a monthly basis. As beehive coke is ordinarily not stored at the ovens in any great quantity, the shipments are an excellent indicator of weekly production. The estimates also allow for shipments over the Monongahela River and other waterways and over private railroads and for amounts consumed by associated steel works close to the ovens. Special thanks are due to the railroads for the prompt and courteous manner in which they have furnished these reports.

The estimates thus obtained are published currently in the weekly coal reports of the Bureau of Mines. At the end of the year, if the total of the current estimates does not exactly equal the actual production as reported to the bureau by the operators a slight adjustment in the current figures is made. The data in the accompanying tables have been revised in this way.

TABLE 5.—*By-product coke produced in the United States, 1919–1926, by months, and average per day, in net tons* [1]

Month	1919		1920		1921		1922	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	2,445,000	78,900	2,426,000	78,300	2,259,000	72,900	1,886,000	60,800
February	2,153,000	76,900	2,343,000	80,800	1,872,000	66,900	1,800,000	64,300
March	2,285,000	73,700	2,646,000	85,400	1,757,000	56,700	2,137,000	68,900
April	2,025,000	67,500	2,267,000	75,600	1,506,000	50,200	2,206,000	73,500
May	1,906,000	61,500	2,400,000	77,400	1,577,000	50,900	2,544,000	82,100
June	1,935,000	64,500	2,487,000	82,900	1,396,000	46,500	2,594,000	86,500
July	2,244,000	72,400	2,658,000	85,700	1,286,000	41,500	2,501,000	80,700
August	2,266,000	73,100	2,742,000	88,500	1,371,000	44,200	1,822,000	58,800
September	2,168,000	72,300	2,744,000	91,500	1,411,000	47,000	2,249,000	75,000
October	1,748,000	56,400	2,915,000	94,000	1,720,000	55,500	2,812,000	90,700
November	1,971,000	65,700	2,679,000	89,300	1,751,000	58,400	2,931,000	97,700
December	1,992,000	64,300	2,527,000	81,500	1,844,000	59,500	3,069,000	99,000
	25,138,000	68,900	30,834,000	84,500	19,750,000	54,100	28,551,000	78,200

[1] Exclusive of screenings and breeze. Based upon reports by the operators. When demand permits, operation of the ovens is continuous and the daily average is the rate per calendar day.

TABLE 5.—*By-product coke produced in the United States, 1919–1926, by months, and average per day, in net tons*—Continued

Month	1923		1924		1925		1926	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	3, 102, 000	100, 100	3, 093, 000	99, 800	3, 404, 000	109, 800	3, 796, 000	122, 500
February	2, 862, 000	102, 200	2, 980, 000	102, 800	3, 118, 000	111, 600	3, 492, 000	124, 700
March	3, 258, 000	105, 100	3, 220, 000	103, 900	3, 449, 000	111, 300	3, 772, 000	121, 700
April	3, 208, 000	106, 900	3, 009, 000	100, 300	3, 308, 000	110, 300	3, 604, 000	120, 100
May	3, 330, 000	107, 400	2, 807, 000	90, 500	3, 280, 000	105, 800	3, 725, 000	120, 200
June	3, 168, 000	105, 600	2, 425, 000	80, 800	3, 151, 000	105, 000	3, 614, 000	120, 500
July	3, 268, 000	105, 400	2, 369, 000	76, 400	3, 167, 000	102, 200	3, 771, 000	121, 600
August	3, 241, 000	104, 500	2, 445, 000	78, 900	3, 159, 000	101, 900	3, 742, 000	120, 700
September	3, 115, 000	103, 800	2, 545, 000	84, 800	3, 178, 000	105, 900	3, 640, 000	121, 300
October	3, 102, 000	100, 100	2, 899, 000	93, 500	3, 395, 000	109, 500	3, 799, 000	122, 500
November	2, 943, 000	98, 100	2, 926, 000	97, 500	3, 550, 000	118, 300	3, 730, 000	124, 300
December	3, 001, 000	96, 800	3, 266, 000	105, 400	3, 753, 000	121, 100	3, 692, 000	119, 100
	37, 598, 000	103, 000	33, 984, 000	93, 100	39, 912, 000	109, 300	44, 377, 000	121, 600

TABLE 6.—*Beehive coke produced in the United States, 1919–1926, by months, and average per day, in net tons* [1]

[Figures of monthly production from 1897 to 1925 were published in "Coke and By-products in 1925," p. 543]

Month	1919		1920		1921		1922	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	2, 366, 000	87, 600	1, 946, 000	72, 100	1, 088, 000	41, 800	529, 000	20, 300
February	1, 767, 000	73, 600	1, 705, 000	71, 000	870, 000	36, 300	586, 000	24, 400
March	1, 714, 000	65, 900	1, 976, 000	73, 200	578, 000	21, 400	781, 000	28, 900
April	1, 277, 000	49, 100	1, 579, 000	60, 700	330, 000	12, 700	564, 000	22, 600
May	1, 101, 000	40, 800	1, 671, 000	64, 300	302, 000	11, 600	465, 000	17, 200
June	1, 143, 000	45, 700	1, 683, 000	64, 700	233, 000	9, 000	491, 000	18, 900
July	1, 457, 000	56, 000	1, 666, 000	64, 100	181, 000	7, 200	476, 000	19, 000
August	1, 681, 000	64, 700	1, 749, 000	67, 300	250, 000	9, 300	567, 000	21, 000
September	1, 736, 000	66, 800	1, 731, 000	66, 600	291, 000	11, 200	649, 000	25, 000
October	1, 504, 000	55, 700	1, 716, 000	66, 000	418, 000	16, 100	935, 000	36, 000
November	1, 629, 000	65, 200	1, 605, 000	61, 700	480, 000	18, 500	1, 214, 000	46, 700
December	1, 668, 000	64, 200	1, 484, 000	57, 100	517, 000	19, 900	1, 316, 000	52, 600
	19, 043, 000	61, 200	20, 511, 000	65, 700	5, 538, 000	17, 800	8, 573, 000	27, 700

Month	1923		1924		1925		1926	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	1, 594, 000	59, 000	1, 228, 000	45, 500	1, 241, 000	46, 000	1, 500, 000	57, 700
February	1, 598, 000	66, 600	1, 288, 000	51, 500	1, 117, 000	46, 500	1, 524, 000	63, 500
March	1, 886, 000	69, 900	1, 429, 000	55, 000	1, 066, 000	41, 000	1, 259, 000	46, 600
April	1, 914, 000	76, 600	1, 148, 000	44, 000	854, 000	32, 800	1, 068, 000	41, 100
May	1, 972, 000	73, 000	810, 000	30, 000	710, 000	27, 300	964, 000	37, 100
June	1, 892, 000	72, 800	590, 000	23, 600	632, 000	24, 300	882, 000	33, 900
July	1, 706, 000	68, 200	476, 000	18, 300	561, 000	21, 600	856, 000	32, 900
August	1, 611, 000	59, 700	462, 000	17, 800	641, 000	24, 700	818, 000	31, 500
September	1, 480, 000	59, 200	556, 000	21, 400	794, 000	30, 500	892, 000	34, 300
October	1, 391, 000	51, 500	671, 000	24, 900	1, 068, 000	39, 600	943, 000	36, 300
November	1, 189, 000	45, 700	670, 000	26, 800	1, 286, 000	51, 400	935, 000	36, 000
December	1, 147, 000	45, 900	958, 000	36, 800	1, 385, 000	53, 300	848, 000	32, 600
	19, 380, 000	62, 300	10, 286, 000	33, 000	11, 355, 000	36, 500	12, 489, 000	40, 200

[1] Based on railroad shipments and prorated to the total production reported by operators.

In "Coke and By-products in 1925," page 544, an historical table was published that gave the monthly shipments from 1894 to 1925 of coke from the Connellsville and Lower Connellsville districts. Corresponding data for 1919 to 1926 are shown in Table 7. Since the publication of the table the bureau has been asked whether these figures relate exclusively to beehive coke or whether they also include the relatively small quantities of by-product coke shipped from the plant at Dunbar, Pa., in the Connellsville region. The inquiry was referred to the editor of the Connellsville Courier, from which the figures were compiled, who states that for several years before 1917 the shipments of the Dunbar plant were included. Since 1917, however, the Courier's statistics have shown only the beehive-coke production of the region.

TABLE 7.—*Coke shipped from the Connellsville and Lower Connellsville districts, Pennsylvania, 1919–1926, by months, in net tons* [1]

Month	1919	1920	1921	1922	1923	1924	1925	1926
January	1,224,220	1,082,289	735,897	377,003	1,046,630	937,790	904,110	1,004,330
February	890,922	967,122	552,568	397,537	1,048,425	921,070	795,690	934,060
March	864,903	1,110,550	361,646	584,497	1,292,435	1,024,770	785,080	856,600
April	645,028	799,578	198,966	377,433	1,270,355	800,420	583,740	756,170
May	470,475	749,537	186,256	247,145	1,342,545	504,740	349,400	672,550
June	536,381	796,698	130,324	276,304	1,306,750	303,370	325,800	602,690
July	760,475	778,345	92,880	283,472	1,196,660	243,090	265,780	555,440
August	1,010,887	909,270	158,250	371,499	1,144,790	205,430	414,510	545,850
September	1,021,096	879,297	188,664	451,240	1,005,200	263,520	513,590	603,680
October	699,156	921,753	257,499	628,333	914,800	329,430	673,920	642,310
November	1,140,109	889,173	303,532	799,087	781,690	451,950	830,460	609,010
December	1,026,312	854,615	405,935	872,950	754,060	668,980	953,040	559,640
	10,289,964	10,738,227	3,572,417	5,666,500	13,104,340	6,654,560	7,395,120	8,342,330

[1] From the Connellsville Courier.

TABLE 8.—*Total coke produced in the United States, 1919–1926, by months, and average per day, in net tons*

Month	1919		1920		1921		1922	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	4,811,000	167,000	4,372,000	150,000	3,347,000	115,000	2,415,000	81,000
February	3,920,000	151,000	4,048,000	152,000	2,742,000	103,000	2,386,000	89,000
March	3,999,000	140,000	4,622,000	159,000	2,335,000	78,000	2,918,000	98,000
April	3,302,000	117,000	3,846,000	136,000	1,836,000	63,000	2,770,000	96,000
May	3,007,000	102,000	4,071,000	142,000	1,879,000	63,000	3,009,000	99,000
June	3,078,000	110,000	4,170,000	148,000	1,629,000	56,000	3,085,000	105,000
July	3,701,000	128,000	4,324,000	150,000	1,467,000	49,000	2,977,000	100,000
August	3,947,000	138,000	4,491,000	156,000	1,621,000	54,000	2,389,000	80,000
September	3,904,000	139,000	4,475,000	158,000	1,702,000	58,000	2,898,000	100,000
October	3,252,000	112,000	4,631,000	160,000	2,138,000	72,000	3,747,000	127,000
November	3,600,000	131,000	4,284,000	151,000	2,231,000	77,000	4,145,000	144,000
December	3,660,000	129,000	4,011,000	139,000	2,361,000	79,000	4,385,000	152,000
	44,181,000	130,000	51,345,000	150,000	25,288,000	72,000	37,124,000	106,000

TABLE 8.—*Total coke produced in the United States, 1919–1926, by months, and average per day, in net tons*—Continued

Month	1923		1924		1925		1926	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
January	4,696,000	159,000	4,321,000	145,000	4,645,000	156,000	5,296,000	180,200
February	4,460,000	169,000	4,268,000	154,000	4,235,000	158,000	5,016,000	188,200
March	5,144,000	175,000	4,649,000	159,000	4,515,000	152,000	5,031,000	168,300
April	5,122,900	184,000	4,157,000	144,000	4,162,000	143,000	4,672,000	161,200
May	5,302,000	180,000	3,617,000	121,000	3,990,000	133,000	4,689,000	157,500
June	5,060,000	178,000	3,015,000	104,000	3,783,000	129,000	4,496,000	154,400
July	4,974,000	174,000	2,845,000	95,000	3,728,000	124,000	4,627,000	154,500
August	4,852,000	165,000	2,907,000	97,000	3,800,000	127,000	4,560,000	152,200
September	4,595,000	163,000	3,101,000	106,000	3,972,000	136,000	4,532,000	155,600
October	4,493,000	152,000	3,570,000	118,000	4,463,000	149,000	4,742,000	158,800
November	4,132,000	144,000	3,596,000	124,000	4,836,000	170,000	4,665,000	160,300
December	4,148,000	143,000	4,224,000	142,000	5,138,000	174,000	4,540,000	151,700
	56,978,000	165,000	44,270,000	126,000	51,267,000	146,000	56,866,000	161,800

TABLE 9.—*Beehive coke produced in the United States in 1926, by weeks*

[Estimated from railroad shipments]

Week ended—	Net tons	Week ended—	Net tons	Week ended—	Net tons
Jan. 1-2	106,000	May 15	221,000	Sept. 25	214,000
Jan. 9	315,000	May 22	229,000	Oct. 2	199,000
Jan. 16	338,000	May 29	211,000	Oct. 9	220,000
Jan. 23	373,000	June 5	212,000	Oct. 16	219,000
Jan. 30	369,000	June 12	213,000	Oct. 23	217,000
Feb. 6	398,000	June 19	201,000	Oct. 30	214,000
Feb. 13	393,000	June 26	203,000	Nov. 6	209,000
Feb. 20	384,000	July 3	177,000	Nov. 13	219,000
Feb. 27	349,000	July 10	192,000	Nov. 20	223,000
Mar. 6	288,000	July 17	198,000	Nov. 27	214,000
Mar. 13	285,000	July 24	187,000	Dec. 4	209,000
Mar. 20	286,000	July 31	191,000	Dec. 11	200,000
Mar. 27	272,000	Aug. 7	180,000	Dec. 18	192,000
Apr. 3	255,000	Aug. 14	177,000	Dec. 25	160,000
Apr. 10	248,000	Aug. 21	198,000	Dec. 27–31	156,000
Apr. 17	254,000	Aug. 28	196,000		
Apr. 24	248,000	Sept. 4	201,000		12,489,000
May 1	228,000	Sept. 11	198,000		
May 8	231,000	Sept. 18	213,000		

TABLE 10.—*By-product coke produced in the United States in 1926, by months and by States, in net tons* [1]

State	January	February	March	April	May	June	July
Alabama	430,000	394,000	413,000	382,000	398,000	391,000	402,000
Colorado	53,000	47,000	53,000	51,000	52,000	43,000	47,000
Illinois	281,000	255,000	305,000	285,000	297,000	296,000	301,000
Indiana	455,000	471,000	500,000	483,000	507,000	503,000	546,000
Maryland	116,000	107,000	94,000	102,000	96,000	84,000	78,000
Massachusetts	47,000	42,000	49,000	46,000	48,000	42,000	47,000
Michigan	156,000	141,000	156,000	151,000	158,000	143,000	151,000
Minnesota	53,000	47,000	52,000	48,000	51,000	51,000	54,000
New Jersey	80,000	69,000	79,000	75,000	77,000	76,000	74,000
New York	234,000	214,000	239,000	235,000	242,000	219,000	240,000
Ohio	653,000	582,000	639,000	615,000	629,000	618,000	644,000
Pennsylvania	978,000	884,000	928,000	890,000	927,000	903,000	940,000
Tennessee	10,000	11,000	12,000	11,000	10,000	9,000	8,000
Utah	15,000	14,000	15,000	15,000	16,000	15,000	16,000
Washington	4,000	3,000	4,000	3,000	4,000	3,000	4,000
West Virginia	96,000	88,000	99,000	81,000	79,000	76,000	93,000
Kentucky, Missouri, Rhode Island, and Wisconsin	135,000	123,000	135,000	131,000	134,000	129,000	131,000
	3,796,000	3,492,000	3,772,000	3,604,000	3,725,000	3,614,000	3,771,000

[1] Based upon reports from all producers.

TABLE 10.—*By-product coke produced in the United States in 1926, by months and by States, in net tons*—Continued

State	August	September	October	November	December	Total
Alabama	405,000	393,000	389,000	398,000	385,000	4,780,000
Colorado	49,000	48,000	50,000	49,000	51,000	593,000
Illinois	279,000	270,000	277,000	244,000	247,000	3,337,000
Indiana	533,000	505,000	517,000	498,000	473,000	5,990,000
Maryland	78,000	86,000	93,000	95,000	92,000	1,121,000
Massachusetts	46,000	46,000	49,000	48,000	57,000	574,000
Michigan	153,000	148,000	155,000	153,000	156,000	1,827,000
Minnesota	53,000	51,000	54,000	52,000	54,000	620,000
New Jersey	73,000	72,000	79,000	77,000	82,000	913,000
New York	235,000	239,000	245,000	236,000	250,000	2,828,000
Ohio	655,000	629,000	653,000	635,000	596,000	7,548,000
Pennsylvania	926,000	906,000	980,000	973,000	970,000	11,201,000
Tennessee	9,000	9,000	9,000	10,000	11,000	119,000
Utah	16,000	16,000	16,000	15,000	16,000	185,000
Washington	4,000	3,000	3,000	3,000	4,000	42,000
West Virginia	96,000	93,000	99,000	115,000	115,000	1,130,000
Kentucky, Missouri, Rhode Island, and Wisconsin	132,000	126,000	131,000	129,000	133,000	1,569,000
	3,742,000	3,640,000	3,799,000	3,730,000	3,692,000	44,377,000

PRODUCTION BY FURNACE AND NONFURNACE PLANTS

In "Coke and By-products in 1922," page 693, statistics were published for the first time that gave the production of "furnace" by-product coke plants as opposed to "other" plants. The classification has been of value to the coke trade, but developments in the industry have made it advisable to change the definition of what constitutes a "furnace" plant and consequently to change the allocation of certain plants from "furnace" to "other," and vice versa. Because of these changes in classification the figures in Tables 11 to 13 differ from those previously published.

The terms "furnace" and "merchant" operators originated in the Connellsville beehive-coke trade. As the name implies, the beehive-furnace interests are those affiliated with the producers of iron and steel and whose output does not ordinarily enter the open market. In the by-product industry, however, it is not always easy to classify a particular plant. There are by-product plants financially affiliated with iron furnaces in which the bulk of the product is nevertheless foundry and domestic coke which must be sold on the competitive market. There have been other plants—entirely independent of iron furnaces in point of ownership—that nevertheless were operated under contract to produce furnace coke exclusively for an adjacent iron works.

A "furnace" plant is now defined as one that has for its main business the production of furnace coke and that has an assured outlet for its furnace coke either through financial affiliation with or direct ownership by an iron works, or through long-time contracts.

Under this definition the class of "other" plants includes a few plants affiliated with local iron furnaces but producing much more coke than the furnaces can absorb and therefore depending chiefly on the foundry and domestic trade or on merchant sales of furnace coke. It also includes merchant producers of furnace coke who have to sell their output on the competitive market; it includes the plants affiliated with alkali works; it includes all those operated as gas utilities; and it includes the growing number of plants, which, though not public utilities, have been constructed primarily to supply city

gas and which must sell their coke where they can for domestic and industrial as well as metallurgical use. Because of the miscellaneous character of this group of plants, it is thought best to designate them not as "merchant" but as "nonfurnace" or "other" plants.

TABLE 11.—*Number and production of by-product coke plants connected with iron furnaces and of other by-product plants, 1913–1926* [1]

Year	Number of active plants		Coke produced (net tons)		Percentage of production	
	Furnace plants	Other plants	Furnace plants	Other plants	Furnace plants	Other plants
1913	20	16	9, 277, 832	3, 436, 868	73. 0	27. 0
1914	22	15	7, 832, 950	3, 386, 993	69. 8	30. 2
1915	23	17	10, 206, 434	3, 866, 461	72. 5	27. 5
1916	28	18	14, 006, 214	5, 063, 147	73. 4	26. 6
1917	31	21	16, 607, 870	5, 831, 410	74. 0	26. 0
1918	36	24	19, 220, 342	6, 777, 238	73. 9	26. 1
1919	40	25	19, 135, 587	6, 002, 034	76. 1	23. 9
1920	42	26	24, 257, 128	6, 576, 823	78. 7	21. 3
1921	42	25	15, 878, 899	3, 870, 681	80. 4	19. 6
1922	39	25	22, 850, 186	5, 700, 359	80. 0	20. 0
1923	40	25	29, 660, 369	7, 937, 295	78. 9	21. 1
1924	42	29	26, 919, 283	7, 064, 285	79. 2	20. 8
1925	43	31	31, 494, 030	8, 418, 129	78. 9	21. 1
1926	43	35	34, 714, 462	9, 662, 124	78. 2	21. 8

[1] Because of a change in the definition of a "furnace" plant, the classification of certain plants has been changed from "furnace" to "other" and vice versa, and the figures for 1913 to 1925 differ from those previously published. For the present classification of individual plants, see Table 22.

TABLE 12.—*Monthly and average daily production of by-product coke by plants associated with iron furnaces and by all other plants, 1924–1926, in net tons* [1]

	1924		1925		1926	
	Furnace plants	Other plants	Furnace plants	Other plants	Furnace plants	Other plants
Monthly production:						
January	2, 453, 000	640, 000	2, 748, 000	656, 000	2, 974, 000	822, 000
February	2, 372, 000	608, 000	2, 476, 000	642, 000	2, 693, 000	799, 000
March	2, 578, 000	642, 000	2, 737, 000	712, 000	2, 942, 000	830, 000
April	2, 410. 000	599, 000	2, 628, 000	680, 000	2, 826, 000	778, 000
May	2, 206, 000	601, 000	2, 591. 000	689, 000	2, 921, 000	804, 000
June	1, 859, 000	566, 000	2, 488, 000	663, 000	2, 828, 000	786, 000
July	1, 828, 000	541, 000	2, 476, 000	691, 000	2, 979, 000	792, 000
August	1, 908, 000	537, 000	2, 453, 000	706, 000	2, 943, 000	799, 000
September	2, 005, 000	540, 000	2, 481, 000	697, 000	2, 851, 000	789, 000
October	2, 312, 000	587, 000	2, 652, 000	743, 000	2, 971, 000	828, 000
November	2, 338, 000	588, 000	2, 807, 000	743, 000	2, 918, 000	812, 000
December	2, 650, 000	616 000	2, 957, 000	796, 000	2, 869, 000	823, 000
	26, 919, 000	7, 065, 000	31, 494, 000	8, 418. 000	34, 715. 000	9, 662, 000
Average daily production:						
January	79, 000	21, 000	89, 000	21, 000	96. 000	27. 000
February	82, 000	21, 000	88, 000	23, 000	96. 000	29. 000
March	83, 000	21, 000	88. 000	23, 000	95. 000	27. 000
April	80, 000	20, 000	87, 000	23, 000	94. 000	26, 000
May	71, 000	20, 000	84, 000	22, 000	94, 000	26, 000
June	62, 000	19, 000	83, 000	22, 000	94, 000	26, 000
July	59, 000	17, 000	80. 000	22, 000	96, 000	26, 000
August	62, 000	17, 000	79, 000	23, 000	95, 000	26, 000
September	67, 000	18. 000	83, 000	23, 000	95. 000	26, 000
October	75. 000	19, 000	86, 000	24, 000	96. 000	27, 000
November	78, 000	20, 000	93, 000	25, 000	97. 000	27. 000
December	85. 000	20, 000	95, 000	26, 000	92. 000	27, 000
Average	74, 000	19. 000	86. 000	23, 000	95. 000	26. 000

[1] Because of a change in the definition of a "furnace" plant the classification of certain plants has been changed from "furnace" to "other" and vice versa, and the figures therefore differ from those previously published. For present classification of individual plants, see Table 22.

TABLE 13.—*Percentage of total monthly output of by-product coke produced by plants associated with iron furnaces and by other plants, 1923–1926*[1]

Month	1923		1924		1925		1926	
	Furnace plants	Other plants	Furnace plants	Other plants	Furnace plants	Other plants	Furnace plants	Other plants
January	78.6	21.4	79.3	20.7	80.7	19.3	78.3	21.7
February	78.2	21.8	79.6	20.4	79.4	20.6	77.1	22.9
March	78.4	21.6	80.1	19.9	79.4	20.6	78.0	22.0
April	78.6	21.4	80.1	19.9	79.5	20.5	78.4	21.6
May	78.7	21.3	78.6	21.4	79.0	21.0	78.4	21.6
June	79.5	20.5	76.7	23.3	78.9	21.1	78.3	21.7
July	79.8	20.2	77.2	22.8	78.2	21.8	79.0	21.0
August	79.3	20.7	78.1	21.9	77.7	22.3	78.7	21.3
September	78.4	21.6	78.8	21.2	78.1	21.9	78.3	21.7
October	78.5	21.5	79.8	20.2	78.1	21.9	78.2	21.8
November	79.1	20.9	79.9	20.1	79.1	20.9	78.2	21.8
December	79.6	20.4	81.1	18.9	78.8	21.2	77.7	22.3
Average	78.9	21.1	79.2	20.8	78.9	21.1	78.2	21.8

[1] Because of a change in the definition of a "furnace" plant the classification of certain plants has been changed from "furnace" to "other," and vice versa, and the figures therefore differ from those previously published. For the present classification of individual plants, see Table 22.

PRODUCTION BY STATES AND DISTRICTS

Each of the principal producing States shared in the increased demand for coke in 1926. (Table 14.) Only the relatively unimportant States of Georgia, Virginia, Utah, and Washington showed a decrease in total output when compared with the preceding year. New York, with an increase of 27.4 per cent above the figure for 1925, recorded the largest individual gain. Notable increases were also made in several other States, particularly Colorado, Minnesota, and Indiana.

In the by-product industry the increase was universal. Every one of the 20 States where by-product coke is manufactured produced more in 1926 than in the preceding year. On the other hand, a decline in the output of beehive coke is noted in all producing States except Pennsylvania, Colorado, and West Virginia. An increase in the production of these three States, however, more than offset the diminution elsewhere, and the total output of beehive coke in 1926 was 10 per cent above that in 1925.

The rank of the several States as producers of coke is shown in Table 15. The dominant position of Pennsylvania remains unchallenged, and in 1926 the State accounted for more than 85 per cent of the beehive, over a quarter of the by-product, and nearly 40 per cent of the total coke produced in the United States. Not only is Pennsylvania the principal coke-producing State, but large quantities of her celebrated coking coals are shipped annually to other States for use in by-product ovens. The famous Pittsburgh bed as it occurs in the Connellsville and adjacent districts is probably the greatest repository of high-grade coking coal in the world. Ohio ranks second as a producer of coke and is followed by Indiana, Alabama, Illinois, New York, Michigan, and West Virginia, in the order named. Tables 16 to 18 give the production by districts in Pennsylvania, Ohio, and West Virginia.

TABLE 14.—*By-product and beehive coke produced, by States, 1918 and 1923–1926, in net tons*

State	1918	1923	1924	1925	1926
BY-PRODUCT					
Alabama	2,634,451	4,385,366	4,386,372	4,582,153	4,779,986
Colorado	250,663	448,243	523,405	489,657	592,939
Illinois	2,285,610	3,187,168	2,355,474	3,011,497	3,336,962
Indiana	3,898,215	5,042,614	4,272,435	5,141,940	5,990,344
Kentucky	517,749	434,116	(1)	(1)	(1)
Maryland	474,368	861,668	810,118	1,019,209	1,120,610
Massachusetts	556,397	554,125	397,640	535,302	573,748
Michigan	(1)	1,648,773	1,770,547	1,751,118	1,826,638
Minnesota	784,065	695,824	514,764	518,355	619,905
Missouri	(1)	(1)	(1)	(1)	(1)
New Jersey	682,148	897,569	869,120	903,997	913,250
New York	1,069,587	1,783,948	1,600,669	2,219,409	2,827,805
Ohio	5,226,384	6,323,810	5,723,074	7,105,129	7,547,836
Pennsylvania	4,586,981	9,185,747	8,426,155	9,853,262	11,200,624
Rhode Island		(1)	(1)	(1)	(1)
Tennessee	124,469	124,160	75,720	88,879	118,624
Utah			97,350	168,150	184,756
Washington	30,129	31,081	39,903	40,757	42,584
West Virginia	603,393	940,866	998,914	1,055,992	1,129,862
Wisconsin	(1)	(1)	(1)	(1)	(1)
Combined States	2,293,021	1,052,586	1,121,908	1,427,353	1,570,113
	25,997,580	37,597,664	33,983,568	39,912,159	44,376,586
BEEHIVE					
Alabama	1,717,721	268,709	154,686	88,328	(1)
Colorado	758,784	199,580	212,115	154,824	197,179
Georgia	22,048	12,556	8,681	4,925	3,059
Kentucky	301,036	125,595	79,248	(1)	147,540
New Mexico	597,072	(1)	83,070	(1)	(1)
Ohio	138,909	149,796	109,625	156,058	84,970
Oklahoma	(1)	(1)			
Pennsylvania	22,136,664	16,438,539	8,501,282	9,574,341	10,722,352
Tennessee	302,637	180,351	131,755	127,609	122,410
Utah	(1)	232,941	159,744	146,009	121,475
Virginia	1,234,256	774,887	485,064	421,691	370,983
Washington	93,659	37,987	31,712	38,500	24,702
West Virginia	2,716,613	821,909	329,655	490,040	583,599
Combined States	461,393	137,020		152,459	110,682
	30,480,792	19,379,870	10,286,037	11,354,784	12,488,951
Grand total	56,478,372	56,977,534	44,269,605	51,266,943	56,865,537

[1] Included under "Combined States."

TABLE 15.—*Rank of States in the production of coke, 1922–1926*

State	1922	1923	1924	1925	1926	State	1922	1923	1924	1925	1926
Pennsylvania	1	1	1	1	1	Minnesota	13	12	12	15	13
Ohio	2	2	2	2	2	Wisconsin	14	14	14	13	14
Indiana	3	3	4	3	3	Massachusetts	15	16	15	14	15
Alabama	4	4	3	4	4	Virginia	16	11	13	16	16
Illinois	5	5	5	5	5	Utah	18	19	17	17	17
New York	6	6	7	6	6	Missouri	17	18	18	18	18
Michigan	7	8	6	7	7	Tennessee	20	17	19	19	19
West Virginia	8	7	8	8	8	Rhode Island	19	20	20	20	20
Maryland	10	10	10	9	9	Washington	22	22	22	21	21
New Jersey	9	9	9	10	10	New Mexico	21	21	21	22	22
Colorado	12	13	11	11	11	Georgia	23	23	23	23	23
Kentucky	11	15	16	12	12	Oklahoma		24			

TABLE 16.—*By-product and beehive coke produced in Pennsylvania, 1925 and 1926, by districts*

[The figures of number of plants and of ovens include those that were idle during the year]

District	Plants	Ovens		Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens	
		Built	Under construction				Total	Per ton
1925								
By-product:								
Eastern Pennsylvania [1]	5	829	-------	2,783,259	72.2	2,010,873	$11,077,777	$5.51
Western Pennsylvania [2]	7	2,391	60	11,896,577	65.9	7,842,389	23,441,086	2.99
	12	3,220	60	14,679,836	67.1	9,853,262	34,518,863	3.50
Beehive:								
Allegheny Mountain and Allegheny Valley	7	680	-------	164,891	66.1	108,994	549,170	5.04
Connellsville	62	15,333	-------	6,470,819	66.3	4,291,429	19,525,302	4.55
Lower Connellsville	54	11,552	-------	5,058,370	66.7	3,372,377	13,568,195	4.02
Pittsburgh	5	1,552	-------	1,271,731	60.3	766,645	3,450,073	4.50
Upper Connellsville	12	1,652	-------	601,664	63.1	379,546	1,845,060	4.86
Other districts [3]	13	3,899	-------	1,004,807	65.2	655,350	2,937,815	4.48
	153	34,668	-------	14,572,282	65.7	9,574,341	41,875,615	4.37
Grand total	165	37,888	60	29,252,118	66.4	19,427,603	76,394,478	3.93
1926								
By-product:								
Eastern Pennsylvania [1]	5	829	-------	3,143,867	72.3	2,273,813	12,635,798	5.56
Western Pennsylvania [2]	7	2,297	425	13,751,203	64.9	8,926,811	36,087,137	4.04
	12	3,126	425	16,895,070	66.3	11,200,624	48,722,935	4.35
Beehive:								
Allegheny Mountain and Allegheny Valley	8	725	-------	195,769	58.3	114,061	668,657	5.86
Connellsville	65	15,454	-------	7,411,701	66.2	4,905,254	22,279,293	4.54
Lower Connellsville	52	11,458	-------	5,889,788	66.9	3,938,159	16,318,593	4.14
Pittsburgh	4	1,553	-------	1,004,285	61.3	615,349	2,661,804	4.33
Upper Connellsville	12	1,668	-------	693,453	59.0	409,437	2,233,491	5.46
Other districts [3]	12	3,517	-------	1,149,443	64.4	740,092	3,433,346	4.64
	153	34,375	-------	16,344,439	65.6	10,722,352	47,595,184	4.44
Grand total	165	37,501	425	33,239,509	66.0	21,922,976	96,318,119	4.39

[1] Includes plants at Bethlehem, Chester, Lebanon, Steelton, and Swedeland.
[2] 1925: Includes plants at Clairton, Dunbar, Erie, Glassport, Johnstown, Midland, and Pittsburgh; 1926: Clairton, Dunbar, Erie, Johnstown, Midland, Pittsburgh, and Woodlawn.
[3] Includes Bedford, Clearfield, Huntingdon, Jefferson, and parts of Indiana and Westmoreland Counties.

TABLE 17.—*By-product and beehive coke produced in Ohio, 1925 and 1926, by districts*

District	Plants	Ovens		Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens	
		Built	Under construction				Total	Per ton
1925								
By-product:								
Canton and Cleveland	4	531	-------	3,313,194	70.2	2,325,592	$12,336,557	$5.30
Youngstown	3	594	-------	3,366,145	66.4	2,236,350	9,721,290	4.35
Other districts [1]	7	564	-------	3,656,729	69.5	2,543,187	12,132,844	4.77
	14	1,689	-------	10,336,068	68.7	7,105,129	34,190,691	4.81
Beehive	2	204	-------	240,828	64.8	156,058	[2]	[2]
Grand total	16	1,893	-------	10,576,896	68.7	7,261,187	[2]	[2]
1926								
By-product:								
Canton and Cleveland	4	531	49	3,428,260	70.0	2,398,604	12,910,087	5.38
Youngstown	3	594	-------	3,504,498	65.4	2,292,061	13,231,869	5.77
Other districts [1]	7	564	40	4,029,965	70.9	2,857,171	14,202,568	4.97
	14	1,689	89	10,962,723	68.9	7,547,836	40,344,524	5.35
Beehive	2	204	-------	125,883	67.5	84,970	[2]	[2]
Grand total	16	1,893	89	11,088,606	68.8	7,632,806	[2]	[2]

[1] Includes plants at Dover, Ironton, Lorain, Painesville, Portsmouth, Toledo, and Warren.
[2] Not at liberty to publish.

TABLE 18.—*By-product and beehive coke produced in West Virginia, 1925 and 1926, by districts*

[The figures of number of plants and ovens include those that were idle during the year]

District	Plants	Ovens		Coal used (net tons)	Yield of coke from coal (per cent)	Coke produced (net tons)	Value of coke at ovens	
		Built	Under construction				Total	Per ton
1925								
By-product:								
Fairmont, Benwood, Follansbee, and Weirton	4	[1] 311	.....	1,526,820	69.2	1,055,992	$4,479,866	$4.24
Beehive:								
Flat Top	12	1,938	.....	297,403	58.4	173,734	706,446	4.07
Tug River	1	1,885	.....					
Kanawha	4	583	.....	120,847	60.7	73,406	264,594	3.60
New River	10	1,046	.....	181,763	63.2	114,856	667,242	5.81
Upper Monongahela and Panhandle	18	1,544	.....	171,826	61.8	106,251	439,147	4.13
Upper Potomac and Tygarts Valley	7	851	.....	32,216	67.6	21,793	91,450	4.20
	52	7,847	.....	804,055	60.9	490,040	2,168,879	4.43
Grand total	56	8,158	.....	2,330,875	66.3	1,546,032	6,648,745	4.30
1926								
By-product:								
Fairmont, Benwood, Follansbee, and Weirton	4	[1] 411	.....	1,632,790	69.2	1,129,862	4,265,884	3.78
Beehive:								
Flat Top	10	1,606	.....	299,842	60.1	180,185	779,234	4.32
Tug River	1	1,885	.....					
Kanawha	4	583	.....	178,594	60.7	108,363	398,179	3.67
New River	7	704	.....	219,164	59.2	129,834	759,111	5.85
Upper Monongahela and Panhandle	17	1,524	.....	154,337	62.0	95,716	445,624	4.66
Upper Potomac and Tygarts Valley	7	851	.....	105,092	66.1	69,501	270,071	3.89
	46	7,153	.....	957,029	61.0	583,599	2,652,219	4.54
Grand total	50	7,564	.....	2,589,819	66.2	1,713,461	6,918,103	4.04

[1] 1925: 191 Koppers and 120 Semet-Solvay ovens; 1926: 291 Koppers and 120 Semet-Solvay ovens.

NUMBER AND TYPE OF OVENS

TABLE 19.—*By-product coke ovens built and under construction at end of each year by States, 1923–1926*

State	1923		1924		1925		1926	
	Built	Under construction	Built	Under construction	Built	Under construction	Built	Under construction
Alabama	1,196	.....	1,196	25	1,276	.....	1,276	112
Colorado	120	.....	120	.....	120	.....	120	.....
Illinois	899	.....	739	110	849	.....	849	.....
Indiana	1,213	.....	1,133	19	1,177	212	1,394	40
Maryland	300	.....	300	.....	300	.....	300	60
Massachusetts	400	.....	400	11	419	.....	466	15
Michigan	390	32	420	2	420	2	420	120
Minnesota	220	.....	220	.....	220	.....	220	.....
New Jersey	252	.....	202	.....	206	.....	207	.....
New York	598	114	686	55	506	155	661	[1] 117
Ohio	1,619	84	1,689	.....	1,689	.....	1,689	89
Pennsylvania	3,094	366	3,420	25	3,220	60	3,126	425
Tennessee	24	.....	24	.....	24	.....	24	.....
Utah	.....	33	33	.....	33	.....	33	.....
Washington	20	.....	20	.....	20	.....	20	.....
West Virginia	311	.....	311	.....	311	.....	411	.....
Kentucky, Missouri, Rhode Island, and Wisconsin	500	.....	500	.....	500	.....	500	.....
	11,156	629	11,413	247	11,290	429	11,716	[1] 978

[1] Includes information published in Iron Age, Jan. 20, 1927, p. 257, as to ovens under construction at one plant.

TABLE 20.—*Beehive coke ovens at end of each year, by States, 1921–1926*

State	1921	1922	1923	1924	1925	1926	
						Built	Under construction
Alabama	6,717	6,460	6,199	6,199	4,961	1,831	
Colorado	1,758	1,758	1,758	1,696	1,681	1,527	
Georgia	151	151	151	151	151	151	
Kentucky	855	795	795	795	795	763	
New Mexico	1,030	1,030	1,030	1,030	1,030	584	
Ohio	205	205	205	205	204	204	
Oklahoma	300	300	300	300	300	300	
Pennsylvania	39,806	38,593	37,578	36,030	34,668	34,375	
Tennessee	1,848	1,822	1,767	1,555	1,675	1,605	
Utah	819	819	819	819	819	819	
Virginia	3,474	3,372	3,284	3,234	3,124	2,914	
Washington	408	408	408	408	332	332	
West Virginia	8,643	8,245	8,055	8,010	7,847	7,153	
	66,014	63,958	62,349	60,432	57,587	52,558	

TABLE 21.—*Coke ovens completed and abandoned in 1926 and total number in existence and under construction at end of year, by States*

State	Plants in existence	Ovens						
		New [1]		Abandoned during year	In existence Dec. 31		Under construction Dec. 31	
		Number	Capacity per day (net tons of coke)		Number	Capacity per day (net tons of coke)	Number	Capacity per day (net tons of coke)
BY-PRODUCT								
Alabama	8				1,276	14,698	112	2,219
Colorado	1				120	1,700		
Illinois	7				849	11,881		
Indiana	7	242	3,996	25	1,394	19,802	40	42
Maryland	1				300	4,200	60	840
Massachusetts	2	55	925		466	2,717	15	88
Michigan	5			2	420	5,080	120	1,900
Minnesota	3				220	2,327		
New Jersey	2				207	2,562		
New York	8	155	1,951		661	9,213	117	2,325
Ohio	14				1,689	21,717	89	1,559
Pennsylvania	12	182	2,810	156	3,126	36,524	425	7,070
Tennessee	1				24	400		
Utah	1				33	600		
Washington	1				20	117		
West Virginia	4	100	1,470		411	4,976		
Kentucky, Missouri, Rhode Island, and Wisconsin	5				500	5,776		
	82	734	11,152	183	11,716	144,290	978	16,421
BEEHIVE								
Alabama	12			3,036	1,831			
Colorado	5			154	1,527			
Georgia	1				151			
Kentucky	3			32	763			
New Mexico	2			446	584			
Ohio	2				204			
Oklahoma	2				300	[2]		
Pennsylvania	153			503	34,375			
Tennessee	7			170	1,605			
Utah	1				819			
Virginia	12				2,914			
Washington	4				332			
West Virginia	46			677	7,153			
	250			5,018	52,558	[2]		

[1] Represents new construction. Does not include ovens repaired and put into commission.
[2] Data not available.

TABLE 22.—*List of by-product coke plants in the United States, December 31, 1926*

State	Town	Name of company operating plant	Type of plant [1]	Number of ovens	Type of oven	Year put in operation [2]
Alabama	Alabama City	Gulf States Steel Co	F	37	Koppers	1916
	Ensley	Semet-Solvay Co	(3)	(3)	(3)	(3)
	Fairfield	Tennessee Coal, Iron & R. R. Co.	F	434	Koppers	1912–1920
	North Birmingham.	Sloss-Sheffield Steel & Iron Co.	F	120	Semet-Solvay	1920
	Tarrant	Alabama By-Products Corp.	M	100	Koppers	1920–1925
	Thomas	Republic Iron & Steel Co.	F	57	do	1925
	Tuscaloosa	Central Iron & Coal Co	F	60	Semet-Solvay	1906–1914
	Woodward	Woodward Iron Co	F	168	Koppers	1911–1914
	do	do	F	60	Wilputte	1917
Colorado	Pueblo	Colorado Fuel & Iron Co.	F	120	Koppers	1918
Illinois	Chicago	Chicago By-Product Coke Co.	M	105	do	1921–22
	Granite City	St. Louis Coke & Iron Co.	F	80	Roberts	1921
	Joliet	Illinois Steel Co	F	280	Koppers	1908–9
	Lockport	Coal Products Manufacturing Co.	M	17	Wilputte	1912
	do	do	M	36	Koppers	1912
	South Chicago	By-Products Coke Corp	M	120	Semet-Solvay	1905–1915
	do	do	M	110	Koppers	1925
	do	Wisconsin Steel Co	F	88	Wilputte	1919
	Waukegan	North Shore Gas Co	M	13	Semet-Solvay	1912
Indiana	Fort Wayne	Northern Indiana Gas & Elec. Co.	M	19	Koppers	1925
	Gary	Illinois Steel Co	F	838	do	1911–1926
	Indiana Harbor.	Inland Steel Co	F	204	do	1913–1926
	do	Youngstown Sheet & Tube Co.	F	120	Semet-Solvay	1919
	Indianapolis	Citizens Gas Co	M	50	United-Otto	1913
	do	do	M	41	Semet-Solvay	1913
	do	do	M	40	Wilputte	1918
	Muncie	Central Indiana Gas Co	M	22	Klönne	1912
	Terre Haute	Indiana Consumers Gas and By-Products Co.	M	60	Koppers	1919–1926
Kentucky	Ashland	Ashland By-Product Coke Co.	(3)	(3)	(3)	(3)
Maryland	Sparrows Point	Bethlehem Steel Co	F	300	Koppers	1914–1922
Massachusetts	Everett	New England Fuel & Transportation Co.	M	400	United-Otto	1899
	do	do	M	55	Wilputte	1926
	Lynn	Lynn Gas & Elec. Co	M	11	Koppers	1925
Michigan	Battle Creek	Battle Creek Gas Co	M	11	do	1924
	Dearborn	Ford Motor Co	F	120	Semet-Solvay	1919
	Detroit	Solvay Process Co	(3)	(3)	(3)	(3)
	Wyandotte	Michigan Alkali Co	M	54	United-Otto	1902–1916
	Zilwaukee	Consumers Power Co	M	19	Koppers	1924
Minnesota	Duluth	Minnesota Steel Co	F	90	do	1915–16
	St. Paul	Minnesota By-Product Coke Co.	M	65	do	1918
	West Duluth	Zenith Furnace Co	F	65	United-Otto	1904–1916
Missouri	St. Louis	Laclede Gas Light Co	M	56	Koppers	1915
	do	do	M	8	Piette	1921
New Jersey	Camden	Camden Coke Co	M	37	Koppers	1921
	Kearny	Seaboard By-Product Coke Co.	M	170	do	1917–1925
New York	Buffalo	Donner-Hanna Coke Corp.	F	150	do	1920
	do	Semet-Solvay Co	(3)	(3)	(3)	(3)
	Geneva	Empire Gas & Electric Co.	M	46	Semet-Solvay	1904–1909
	Hunts Point	Consolidated Gas Co	M	74	Koppers	1926
	Lackawanna	Bethlehem Steel Co	F	60	Semet-Solvay	1920
	do	do	F	114	Koppers	1924
	Rochester	Rochester Gas & Electric Co.	M	60	do	1926
	Troy	Hudson Valley Coke & Products Corp.	F	55	American	1925
	Utica	Utica Gas & Electric Co	M	42	Koppers	1924–1926

[1] F, "Furnace plants," or plants associated with iron furnaces and steel works. M, "Nonfurnace plants" or "other plants" (see Tables 11–13), including merchant plants, plants associated with industries other than iron and steel, and plants supplying gas under contract for city use. Since the publication of the report for 1925 changes in classification of certain plants have been made to conform with changes in definition of what constitutes a furnace plant.

[2] The first and last years are given for those plants that have two or more installations.

[3] Not at liberty to publish.

TABLE 22.—*List of by-product coke plants in the United States, December 31, 1926*—Continued

State	Town	Name of company operating plant	Type of plant	Number of ovens	Type of oven	Year put in operation
Ohio	Canton	Central Alloy Steel Corp	F	47	Koppers	1916
	Cleveland	American Steel & Wire Co	F	180	do	1918
	do	Corrigan-McKinney Steel Co.	F	204	do	1916
	do	Otis Steel Co	F	100	Semet-Solvay	1910–1913
	Dover	Hanna Furnace Co	F	24	Roberts	1916
	East Youngstown.	Youngstown Sheet & Tube Co.	F	306	Koppers	1916–1918
	Ironton	Ironton By-Product Coke Co.	(3)	(3)	(3)	(3)
	Lorain	National Tube Co	F	208	Koppers	1918
	Painesville	Diamond Alkali Co	M	23	do	1924
	Portsmouth	Portsmouth By-Product Coke Co.	F	108	Semet-Solvay	1917
	Toledo	Toledo Furnace Co	F	94	Koppers	1916
	Warren	Trumbull-Cliffs Furnace Co.	F	47	do	1924
	Youngstown	Republic Iron & Steel Co	F	204	do	1914–1926
	do	Youngstown Sheet & Tube Co.	F	84	do	1917
Pennsylvania	Bethlehem	Bethlehem Steel Co	F	424	do	1918
	Chester	Philadelphia Suburban Gas & Electric Co.	M	25	Morrissey	1925
	Clairton	Carnegie Steel Co	F	1,134	Koppers	1918–1924
	Dunbar	Semet-Solvay Co	(3)	(3)	(3)	(3)
	Erie	Perry Iron Co	F	37	Wilputte	1925
	Johnstown	Bethlehem Steel Co	F	50	Otto-Hoffman	1904
	do	do	F	92	Koppers	1915
	do	do	F	254	Cambria	1906–1920
	do	do	F	88	Semet-Solvay	1921
	Lebanon	do	F	90	do	1904–1921
	Midland	Pittsburgh Crucible Steel Co.	F	100	Koppers	1920
	Pittsburgh	Jones & Laughlin Steel Co.	F	300	do	1919–20
	do	do	F	60	Wilputte	1926
	Steelton	Bethlehem Steel Co	F	120	Semet-Solvay	1907
	do	do	F	60	Koppers	1919
	Swedeland	Rainey-Wood Coke Co	F	110	do	1919
	Woodlawn	Jones & Laughlin Steel Co	F	122	do	1926
Rhode Island	Providence	Providence Gas Co	M	40	do	1919
Tennessee	Altonpark	Tennessee Products Corp	M	24	Semet-Solvay	1915
Utah	Provo	Columbia Steel Corp	F	33	Koppers	1924
Washington	Seattle	Seattle Lighting Co	M	20	Klönne	1914
West Virginia	Benwood	Semet-Solvay Co	(3)	(3)	(3)	(3)
	Fairmont	Domestic Coke Corp	M	60	Koppers	1920
	Follansbee	Wheeling Steel Corp	F	145	do	1917–1926
	Weirton	Weirton Steel Co	F	86	do	1923–1926
Wisconsin	Mayville	Youngstown Sheet & Tube Co.	F	108	Otto-Hoffman	1914–1917
	Milwaukee	Milwaukee Coke & Gas Co.	M	80	Semet-Solvay	1901–1906
	do	do	M	100	Koppers	1921–22

[3] Not at liberty to publish.

TABLE 23.—*List of by-product ovens under construction in the United States, December 31, 1926*

State	Town	Name of company operating plant	Number of ovens	Type of oven	Date of operation
Alabama	Tarrant	Alabama By-products Corp	49	Koppers	October, 1927.
	Fairfield	Tennessee Coal, Iron & R. R. Co.	63	do	February, 1928.
Indiana	Indianapolis	Citizens Gas Co	40	Wilputte	March, 1927.
Maryland	Sparrows Point	Bethlehem Steel Co	60	Koppers	February, 1927.
Massachusetts	Framingham	West Boston Gas Co	15	do	June, 1927.
Michigan	Dearborn	Ford Motor Co	120	Wilputte	July–September, 1927.
New York	Buffalo	Semet-Solvay Co	(1)	(1)	(1).
	Lackawanna	Bethlehem Steel Co	57	Koppers	August, 1927.
Ohio	Massillon	Central Alloy Steel Corp	49	do	April, 1927.
	Painesville	Diamond Alkali Co	23	do	March, 1927.
	Warren	Trumbull-Cliffs Furnace Co	17	do	July, 1927.
Pennsylvania	Clairton	Carnegie Steel Co	348	do	October–December, 1927.
	Johnstown	Bethlehem Steel Co	77	do	November, 1927.

[1] Not at liberty to publish.

TABLE 24.—*List of beehive coke plants that produced coke in 1926*

State, county, and district	Operator	Name or location of works	Ovens in existence
Alabama:			
Jefferson County	Alabama By-Products Corp	Dixiana	103
Do	U. S. Cast Iron Pipe & Foundry Co	Bessemer	100
Colorado:			
La Plata	American Smelting & Refining Co	Durango	28
Las Animas	do	Cokedale	350
Do	Colorado Fuel & Iron Co	Segundo	800
Georgia: Walker	Durham Coal & Iron Co	Chickamauga	151
Kentucky:			
Harlan	Wisconsin Steel Co. (Inc.)	Benham	408
Pike	Manufacturers Coal & Coke Co	Manco	200
New Mexico: Colfax	Phelps Dodge Corp	Dawson	[1] 446
Ohio:			
Columbiana	Hanna Furnace Co	Cherry Valley	202
Jefferson	Steubenville Coal & Mining Co	High Shaft	2
Pennsylvania:			
Allegheny Mountain and Allegheny Valley districts—			
Blair	Glen White Coal & Lumber Co	Glen White	90
Cambria	Hastings Coal & Coke Co	Kinport	50
Do	Pennsylvania Coal & Coke Corp	Gallitzin	45
Do	Taylor McCoy Coal & Coke Co	Gallitzin Shaft	212
Do	Vinton Colliery Co	Vinton Ideal	152
Connellsville district—			
Fayette	Baker Coal Co	Emery	32
Do	Connellsville Coal & Coke Co	Ferguson	32
Do	H. C. Frick Coke Co	Collier	400
Do	do	Continental No. 1	400
Do	do	Continental, No. 2	326
Do	do	Crossland	120
Do	do	Kyle	306
Do	do	Lamont, No. 1	227
Do	do	Lamont, No. 2	350
Do	do	Leisenring, No. 1	499
Do	do	Leisenring, No. 2	500
Do	do	Leisenring, No. 3	502
Do	do	Leith	304
Do	do	Oliphant	256
Do	do	Phillips	400
Do	do	Redstone	402
Do	do	Wynn	240
Do	do	Yorkrun	500
Do	do	Youngstown	245
Do	Gilmore Coke Co	Gilmore	101
Do	Hope Coke Co	Hope	38
Do	Irwin Gas Coal Co	Newcomer	30
Do	Nellie Coal & Coke Co	Nellie	60
Do	Old Connellsville Coke Co	Liberty	34
Do	Oliver & Snyder Steel Co	Oliver, Nos. 1, 2, 3	1,108
Do	W. J. Rainey (Inc.)	Elm Grove	160
Do	do	Mount Braddock	370
Do	do	Paul	109
Do	do	Revere	550
Do	Rich Hill Coal Co	Rich Hill	100
Do	Vanderbilt Coal & Coke Co	Clarissa	120
Westmoreland	Brownfield Coal & Coke Co	Myers	32
Do	Brush Run Coal Co	Brush Run	30
Do	Byrne Coal & Coke Co	Virgie	42
Do	H. C. Frick Coke Co	Calumet	260
Do	do	Dorothy	148
Do	do	Hecla No. 1	272
Do	do	Hecla No. 3	300
Do	do	Mammoth	509
Do	do	Marguerite	399
Do	do	Southwest No. 1	250
Do	do	Standard	799
Do	do	United	300
Do	Hostetter-Connellsville Coke Co	Hostetter	355
Do	do	Whitney Works	352
Do	Humphreys Coal & Coke Co	Humphreys	145
Do	Mahoning Coal & Coke Co	Peerless	32
Do	Mount Pleasant Coke Co	Beatty	180
Do	Mount Pleasant-Connellsville Coke Co	Mount Pleasant	310
Do	Oakville Coal & Coke Co	Elizabeth	98
Do	West Penn By-Product Coke Co	Marion	33
Do	Wineland-Gilmore Coal & Coke Co	Winmore	60
Do	Yukon Coal Co	Yukon	35

[1] Abandoned after producing.

TABLE 24.—*List of beehive coke plants that produced coke in 1926*—Continued

State, county, and district	Operator	Name or location of works	Ovens in existence
Pennsylvania—Continued.			
Lower Connellsville district—			
Fayette	American Coke & Fuel Co	American, No. 1	142
Do	do	American, No. 2	240
Do	Atlas Coke Co	Lafayette	104
Do	Barnett & Adams	Luzerne	34
Do	Bourne-Fuller Coke Co	Searight	328
Do	Century Coke Co	Century	205
Do	Champion Connellsville Coke Co	Champion	40
Do	Connellsville Central Coke Co	Herbert	210
Do	do	Low Phos	200
Do	Consolidated Coke Co	Donald, Nos. 1 and 2	240
Do	do	Sterling	310
Do	Eastern Coke Co	Tower Hill, No. 1	320
Do	Etna Connellsville Coke Co	Garwood	119
Do	Fayette Coke Co	Shamrock	200
Do	H. C. Frick Coke Co	Dearth	250
Do	do	Footedale	400
Do	Gilliland Coke Co	Leon	30
Do	Hecla Coal & Coke Co	Crystal	118
Do	do	Griffin, Nos. 1 and 2	396
Do	do	Isabella, No. 1	260
Do	Hustead-Seamans Coal & Coke Co	Hustead	100
Do	Lincoln Coal & Coke Co	Lincoln Mines	300
Do	McKeefry Coal Co	Geneva	202
Do	Monessen Coal & Coke Co	Alicia	400
Do	Orient Coal & Coke Co	Orient	480
Do	W. J. Parshall	Old Home	100
Do	Puritan Coke Co	Puritan, Nos. 1 and 2	202
Do	do	Puritan, No. 5	80
Do	do	Puritan, No. 6	194
Do	W. J. Rainey (Inc.)	Allison, Nos. 1 and 2	493
Do	Redstone Coal & Coke Co	Thompson, No. 1	80
Do	Republic Coal & Coke Co	Freedom	42
Do	Republic Iron & Steel Co	Republic	400
Do	H. R. Sackett Coal & Coke Co	Sackett	30
Do	Snowdon Coke Co	Mount Hope	300
Do	Southern Connellsville Coke Co	Marion	60
Do	Stern Coal & Coke Co	Eleanor, No. 1	132
Do	Thompson-Connellsville Coke Co	Thompson, No. 2	400
Do	Tower Hill Connellsville Coke Co	Tower Hill, No. 2	394
Do	Union-Connellsville Coke Co	Katherine	140
Do	Waltersburg Coke Co	Edna	80
Do	Washington Coal & Coke Co	Washington, No. 1	469
Do	do	Washington, No. 2	331
Do	Wheeling Steel Corp	LaBelle	200
Pittsburgh district—			
Allegheny	Jones & Laughlin Steel Co	Eliza	720
Beaver	do	Aliquippa	488
Greene	Poland Coal Co	Poland	101
Washington	Reliance Coke & Furnace Co	Reliance	236
Upper Connellsville district—			
Indiana	Graceton Coal & Coke Co	Graceton	202
Do	Potter Coal & Coke Co	Potter	300
Westmoreland	Atlantic Crushed Coke Co	Atlantic, No. 2	120
Do	Baton Coal Co	Wilpen	102
Do	Bradenville Coal & Coke Co	Bradenville	140
Do	Connellsville Coke & Fuel Co	Ligonier	80
Do	Greensburg-Connellsville Coal & Coke Co.	Old Colony	116
Do	Latrobe-Connellsville Coal & Coke Co	Derry, No. 1	293
Do	Lincoln Fuel Co	Chester, No. 2	30
Do	Saxman Coal & Coke Co	Saxman, No. 2	50
Do	Westmoreland-Connellsville Coal & Coke Co.	Fort Palmer	160
Other districts—			
Bedford	Colonial Iron Co	Colonial	216
Clearfield	Cascade Coal & Coke Co	Tyler	400
Huntingdon	Everett-Saxton Co	Melrose	90
Indiana	Merimack Coal Co	Ernest	278
Jefferson	Cascade Coal & Coke Co	Sykesville	400
Westmoreland	Keystone Coal & Coke Co	Crabtree	492
Do	do	Hannastown	516
Do	do	Huron	100
Do	do	Salem	280
Tennessee:			
Grundy	Sewanee Fuel & Iron Co	Coalmont	90
Morgan	Brushy Mountain Coal Mines	Petros	190
Rhea	Cumberland Coal & Iron Co	Prospect	374
Roane	Roane Iron Co	Rockwood	340
Utah: Carbon	Utah Fuel Co	Sunnyside	819

TABLE 24.—*List of beehive coke plants that produced coke in 1926*—Continued

State, county, and district	Operator	Name or location of works	Ovens in existence
Virginia:			
Alleghany	Low Moor Iron Co. of Virginia	Low Moor	100
Wise	Esser Coke Co. (Inc.)	Esserville	122
Do	Hawthorne Coal Co	Hawthorne	50
Do	Intermont Coal & Iron Corp	Josephine	100
Do	Norton Coal Co	Norton	100
Do	Stonega Coke & Coal Co. (Inc.)	Osaka	300
Do	do	Stonega	350
Do	Stonegap Colliery Co	Glamorgan, No. 4	250
Do	Virginia Iron, Coal & Coke Co	Toms Creek	798
Do	Wise Coal & Coke Co	Dorchester	170
Washington:			
King	California & Alaska Corp	Snoqualmie	45
Pierce	Wilkeson Coal & Coke Co	Wilkeson	160
West Virginia:			
Flat Top district—			
McDowell	Houston Collieries Co	Maillard	150
Do	McDowell Coal & Coke Co	McDowell	100
Do	Pulaski Iron Co	Pulaski	445
Mercer	Crystal Coal & Coke Co	Crystal	100
Do	Mill Creek Coal & Coke Co	Mill Creek	55
Kanawha district—			
Fayette	Kanawha & Hocking Coal & Coke Co	Longacre	115
Do	do	National	200
New River district—			
Fayette	Babcock Coal & Coke Co	Sewell	193
Do	Branch Coal & Coke Co	Elverton	58
Do	Fire Creek Coal & Coke Co	Fire Creek	72
Do	Gauley Mountain Coal Co	Gauley Mountain	152
Do	New River & Pocahontas Consolidated Coal Co.	Kay Moor	79
Do	Turkey Knob Coal Co	Turkey Knob	100
Upper Monongahela district—			
Marion	Consolidation Coal Co	Monongah, No. 63	99
Do	Jamison Coal & Coke Co	Jamison, No. 8	105
Do	New England Fuel & Transportation Corp.	Federal	60
Monongalia	Rock Forge Coal & Coke Co	Rock Forge	200
Preston	Preston County Coke Co	Cascade	194
Upper Potomac and Tygarts Valley districts—			
Barbour	Gage Coal & Coke Co	Gage, No. 1	60
Do	Meriden Smokeless Coal Co	Meriden	50
Do	West Virginia Coal & Coke Co	Junior	51
Randolph	do	Coalton, No. 1	412
Do	do	Harding, No. 3	117
Tucker	Cumberland Coal Co	Douglas	125
Upshur	Buckhannon River Coal Co	Adrian	36

TABLE 25.—*By-product ovens of each type at the end of the year, by States, in 1926*

State	Koppers [1]	Semet-Solvay [2]	United Otto [3]	Wilputte	Cambria-Belgian	Roberts	American	Klönne	Morrissey	Piette	Total
1926											
Alabama	796	420		60							1,276
Colorado	120										120
Illinois	531	133		105		80					849
Indiana	1,121	161	50	40				22			1,394
Maryland	300										300
Massachusetts	11		400	55							466
Michigan	30	336	54								420
Minnesota	155		65								220
New Jersey	207										207
New York	440	166					55				661
Ohio	1,397	268				24					1,689
Pennsylvania	2,342	358	50	97	254				25		3,126
Tennessee		24									24
Utah	33										33
Washington								20			20
West Virginia	291	120									411
Kentucky, Missouri, Rhode Island, and Wisconsin	196	188	108							8	500
	7,970	2,174	727	357	254	104	55	42	25	8	11,716

[1] Includes the Koppers-Becker type.
[2] For certain plants the information in this column is derived from Iron Age, Jan. 26, 1928, p. 268.
[3] Includes the Otto-Hoffman and Schniewind types.

CAPACITY OF BY-PRODUCT OVENS

TABLE 26.—*Estimated annual potential production of coke and coal required for charge of by-product coke ovens in the United States, 1924–1926, when operated at different percentages of maximum capacity, in millions of net tons*

Percentage of maximum capacity	1924				1925				1926			
	Ovens completed Dec. 31		Including ovens under construction		Ovens completed Dec. 31		Including ovens under construction		Ovens completed Dec. 31		Including ovens under construction	
	Coke	Coal [1]	Coke	Coal [1]	Coke	Coal [1]	Coke	Coal [1]	Coke	Coal [1]	Coke	Coal [1]
100	46.3	66.1	47.9	68.4	48.2	68.8	50.7	72.4	52.7	75.3	58.7	83.9
90	41.7	59.5	43.1	61.6	43.4	61.9	45.6	65.2	47.4	67.8	52.8	75.5
85	39.4	56.2	40.7	58.1	41.0	58.5	43.1	61.5	44.8	64.0	49.9	71.3
75	34.7	49.6	35.9	51.3	36.2	51.6	38.0	54.3	39.5	56.5	44.0	62.9
50	23.2	33.1	24.0	34.2	24.1	34.4	25.4	36.2	26.4	37.7	29.4	42.0

[1] Coal for charge estimated on basis of 70 per cent yield in coke.

TABLE 27.—*Percentage of maximum capacity produced by by-product coke operators, 1921–1926, by months*

	1921	1922	1923	1924	1925	1926		1921	1922	1923	1924	1925	1926
January	62.3	50.4	83.2	81.4	86.0	94.6	August	37.5	48.2	86.5	61.1	77.8	88.3
February	57.3	53.4	85.0	83.8	86.0	96.4	September	39.7	62.3	85.9	65.7	80.9	88.7
March	48.6	57.4	87.2	84.8	85.7	93.8	October	45.9	75.4	82.8	71.7	82.0	88.5
April	42.7	59.2	88.7	81.4	84.9	89.5	November	48.4	81.2	81.1	74.8	88.5	88.9
May	43.4	68.1	89.1	73.1	80.9	89.0	December	49.7	82.2	80.1	80.8	90.6	84.7
June	39.4	69.2	87.6	65.3	80.3	88.4							
July	35.1	66.7	87.2	59.2	78.0	89.3	The year	45.8	64.6	85.4	73.4	83.5	89.9

QUANTITY AND COST OF COAL CHARGED

Although the quantity of coal used in the manufacture of coke has been increasing at a rapid rate during the past 30 years ("Coke and By-products in 1925," p. 558), the proportion of the total output of bituminous coal carbonized each year has remained remarkably constant, ranging from 12 to about 15 per cent. The only year showing marked digression from this general trend was 1921, when the country was in the grip of a profound business depression that dealt especially severely with the heavy industries, the principal consumers of coke. In 1926 the coke ovens in the United States used 82,871,110 tons, 14.5 per cent of the total output of bituminous coal (Table 28). Of this amount 63,646,610 tons, or nearly 77 per cent, was used in the by-product ovens.

Table 29 shows the quantity of coal charged into ovens in each State and the value at the ovens. The cost of coal constitutes the chief item of expense in the manufacture of coke. In 1926 the cost per ton of raw coal f. o. b. ovens ranged from $1.60 in Kentucky, where beehive coke is made at the mines, to $5.33 in Minnesota, where the cost includes heavy freight charges from distant mines.

The average cost of coal used in beehive ovens in 1926 amounted to $2 a ton, and the cost of the coal equivalent of a ton of merchantable coke was $3.08.

At the by-product ovens in 1926 the average cost per ton of the coal charged was $3.88, a slight increase over the year preceding but still considerably less than in other years since the war. It should be

remembered, however, that the cost of coal used by the by-product ovens as given in these tables does not necessarily represent the market value of the coal. Many of the by-product operators mine their own coal, and the reported cost is often a bookkeeping value. Still other companies are covered by long-term contracts and are not affected by market flurries. Thus, if the cost of coal to by-product producers represented the prices that coal of similar quality would command on the open market the figures for 1926 would show a marked increase over those for the previous year. Conversely, those for 1924, for example, would be considerably lower than the costs actually reported for that year as shown in Table 30.

TABLE 28.—*Coal used in manufacture of coke in the United States, 1917–1926, in net tons*

[For comparable figures back to 1880, see "Coke and By-products in 1925," p. 558]

Year	By-product	Beehive	Total	Year	By-product	Beehive	Total
1917	31, 505, 759	52, 246, 612	83, 752, 371	1922	41, 052, 670	13, 285, 868	54, 338, 538
1918	36, 867, 721	48, 160, 297	85, 028, 018	1923	54, 275, 577	30, 084, 366	84, 359, 943
1919	35, 857, 419	29, 730, 499	65, 587, 918	1924	49, 061, 339	15, 914, 310	64, 975, 649
1920	44, 204, 996	31, 985, 836	76, 190, 832	1925	57, 109, 651	17, 422, 581	74, 532, 232
1921	28, 713, 111	8, 475, 446	37, 188, 557	1926	63, 646, 610	19, 224, 500	82, 871, 110

TABLE 29.—*Total quantity and value at ovens of coal used in the manufacture of coke, by States, 1925 and 1926*

State	Coal used (net tons)	Cost of coal		Coal per ton of coke	
		Total	Per ton of coal	Net tons	Cost
1925					
By-product plants					
Alabama	6, 516, 689	$17, 487, 682	$2. 68	1. 42	$3. 81
Colorado	706, 948	(1)	(1)	1. 44	.....
Illinois	4, 224, 420	20, 646, 693	4. 89	1. 40	6. 85
Indiana	6, 866, 855	34, 561, 328	5. 03	1. 34	6. 74
Maryland	1, 383, 344	(1)	(1)	1. 36	.....
Massachusetts	797, 699	(1)	(1)	1. 49	.....
Michigan	2, 450, 275	11, 666, 464	4. 76	1. 40	6. 66
Minnesota	791, 992	4, 223, 388	5. 33	1. 53	8. 15
New Jersey	1, 242, 275	(1)	(1)	1. 37	.....
New York	3, 074, 465	13, 857, 369	4. 51	1. 39	6. 27
Ohio	10, 336, 068	39, 454, 515	3. 82	1. 46	5. 58
Pennsylvania	14, 679, 836	43, 615, 257	2. 97	1. 49	4. 43
Tennessee	125, 860	377, 435	3. 00	1. 42	4. 26
Utah	316, 285	(1)	(1)	1. 88	.....
Washington	68, 655	365, 341	5. 32	1. 69	8. 99
West Virginia	1, 526, 820	4, 675, 277	3. 06	1. 45	4. 44
Kentucky, Missouri, Rhode Island, and Wisconsin	2, 001, 165	8, 313, 754	4. 15	1. 40	5. 81
Undistributed	.....	20, 959, 909	4. 71	.....	.....
	57, 109, 651	220, 204, 403	3. 86	1. 43	5. 52
Beehive plants					
Alabama	137, 106	364, 318	2. 66	1. 55	4. 12
Colorado	239, 004	(1)	(1)	1. 54	.....
Georgia	8, 651	27, 934	3. 23	1. 76	5. 68
Ohio	240, 828	(1)	(1)	1. 54	.....
Pennsylvania	14, 572, 282	28, 954, 447	1. 99	1. 52	3. 02
Tennessee	200, 373	537, 013	2. 68	1. 57	4. 21
Utah	247, 473	806, 287	3. 26	1. 69	5. 51
Virginia	661, 193	1, 211, 064	1. 83	1. 57	2. 87
Washington	62, 644	293, 188	4. 68	1. 63	7. 63
West Virginia	804, 055	1, 314, 847	1. 63	1. 64	2. 67
Kentucky and New Mexico	248, 972	693, 712	2. 79	1. 63	4. 55
Undistributed	.....	1, 574, 940	3. 28	.....	.....
	17, 422, 581	35, 777, 750	2. 05	1. 53	3. 14

[1] Included under "Undistributed."

TABLE 29.—*Total quantity and value at ovens of coal used in the manufacture of coke, by States, 1925 and 1926*—Continued

State	Coal used (net tons)	Cost of coal		Coal per ton of coke	
		Total	Per ton of coal	Net tons	Cost
1926					
By-product plants					
Alabama	6,799,773	$18,028,394	$2.65	1.42	$3.76
Colorado	859,725	(1)	(1)	1.45	------
Illinois	4,712,342	22,383,678	4.75	1.41	6.70
Indiana	7,994,696	39,996,809	5.00	1.33	6.65
Maryland	1,534,021	(1)	(1)	1.37	------
Massachusetts	874,053	(1)	(1)	1.52	------
Michigan	2,522,841	11,987,259	4.75	1.38	6.56
Minnesota	903,041	4,811,540	5.33	1.46	7.78
New Jersey	1,260,372	(1)	(1)	1.38	------
New York	3,950,026	18,179,261	4.60	1.40	6.44
Ohio	10,962,723	42,337,226	3.86	1.45	5.60
Pennsylvania	16,895,070	50,241,119	2.97	1.51	4.48
Tennessee	165,065	498,078	3.02	1.39	4.20
Utah	326,544	(1)	(1)	1.77	------
Washington	67,544	359,085	5.32	1.59	8.46
West Virginia	1,632,790	5,011,548	3.07	1.45	4.45
Kentucky, Missouri, Rhode Island, and Wisconsin	2,185,984	8,882,545	4.06	1.39	5.64
Undistributed	----------	24,453,742	5.04	-------	------
	63,646,610	247,170,284	3.88	1.43	5.55
Beehive plants					
Colorado	307,011	(1)	(1)	1.56	------
Georgia	5,125	17,795	3.47	1.68	5.83
Kentucky	249,952	400,156	1.60	1.69	2.70
Ohio	125,883	(1)	(1)	1.48	------
Pennsylvania	16,344,439	32,266,831	1.97	1.52	2.99
Tennessee	215,647	481,696	2.23	1.76	3.92
Utah	203,750	679,229	3.33	1.68	5.59
Virginia	599,943	1,176,047	1.96	1.62	3.18
Washington	39,265	171,588	4.37	1.59	6.95
West Virginia	957,029	1,632,858	1.71	1.64	2.80
Alabama and New Mexico	176,456	393,414	2.23	1.59	3.55
Undistributed	----------	1,322,077	3.05	-------	------
	19,224,500	38,541,691	2.00	1.54	3.08

[1] Included under "Undistributed."

TABLE 30.—*Average cost per net ton of coal charged into by-product coke ovens, by States, 1917–1926*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Alabama	$2.54	$3.29	$3.35	$4.10	$3.29	$2.47	$2.95	$2.85	$2.68	$2.65
Illinois	3.81	4.63	4.73	6.49	5.90	5.92	5.78	5.16	4.89	4.75
Indiana	3.87	4.50	4.63	5.92	5.89	5.70	5.77	5.23	5.03	5.00
Kentucky	2.55	3.34	3.40	4.84	4.20	4.28	(1)	(1)	(1)	(1)
Michigan	3.63	4.51	4.60	7.03	5.77	5.65	5.79	5.34	4.76	4.75
Minnesota	4.01	5.31	4.33	6.50	7.12	6.79	6.74	5.89	5.33	5.33
New York	4.33	4.46	4.34	6.20	5.86	5.60	5.31	4.75	4.51	4.60
Ohio	4.36	3.98	3.85	5.75	4.94	5.04	4.84	4.04	3.82	3.86
Pennsylvania	3.29	3.74	2.99	3.91	3.39	3.78	3.77	3.19	2.97	2.97
Tennessee	2.08	3.59	3.64	4.30	3.84	3.84	3.50	3.33	3.00	3.02
Washington	3.87	5.72	5.89	6.63	6.53	5.50	5.44	5.39	5.32	5.32
West Virginia	3.30	3.57	3.18	4.82	3.89	4.07	4.03	3.82	3.06	3.07
Average cost of coal per ton of coke	3.70	4.23	3.96	5.40	4.84	4.73	4.76	4.13	3.86	3.88
	5.20	6.00	5.65	7.73	7.03	6.81	6.85	5.95	5.52	5.55

[1] Not at liberty to publish.

The average value of the coke produced is compared with the cost of the coal per ton of coke in Table 31 and Figure 20. In 1926 the value of beehive coke per ton as reported by the operators was $4.57, while the cost of coal charged in the ovens per ton of coke drawn was $3.08. It is not to be assumed that the margin of $1.49 between these two figures represents the profit realized by the operator. Although coal is the major item of cost there are many other expenses, such as labor, allowance for depreciation of plant equipment, overhead, and taxes, that must be charged off before any profit can be shown.

Under the market conditions that have prevailed during the past few years the cost of coal used at by-product plants has frequently exceeded the value of the coke produced, and in 1926 it came within

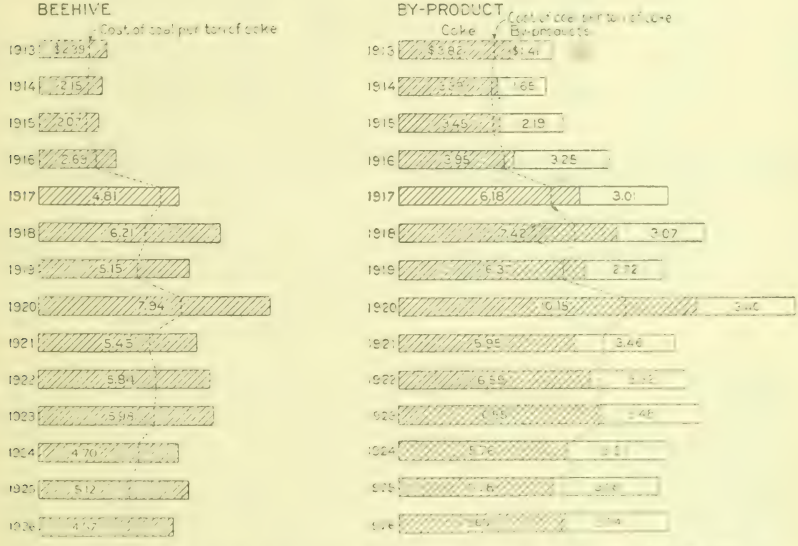

FIGURE 20.—Cost of coal and value of all products per ton of coke produced, 1913–1926

10 cents of the value of the coke. Under these circumstances the producers must rely on the sale of their by-products to carry most of the operating expenses, interest on borrowed capital, depreciation, and profits. In 1926 the operators realized $3.52 from the sale of by-products per ton of coke produced.

The comparisons in Table 31 are subject to the comment already made that where coking operations are subsidiary to the manufacture of pig iron the value placed upon the product may differ from the average market price. Where this is true, however, the average cost of coal may also be a nominal figure, because the plants associated with the iron furnaces are commonly supplied with coal from mines owned by the same financial interests. The comparisons therefore probably indicate in general terms the trend in cost and value from year to year.

TABLE 31.—*Cost of coal and value of all products per net ton of coke produced, 1913–1926*

[All figures reduced to value per net ton of coke produced]

Year	By-product coke					Beehive coke		
		Per ton of coke					Per ton of coke	
	Value of coke per ton [1]	Value of all by-products	Total value of products	Cost of coal	Excess, products over coal	Value of coke per ton [1]	Cost of coal	Excess, coke over coal
1913	$3.83	$1.41	$5.24	$3.27	$1.97	$2.39	$1.75	$0.64
1914	3.39	1.65	5.04	3.19	1.85	2.15	1.67	.48
1915	3.45	2.19	5.64	3.24	2.40	2.07	1.61	.46
1916	3.95	3.25	7.20	3.62	3.58	2.69	1.96	.73
1917	6.18	3.01	9.19	5.20	3.99	4.81	3.17	1.64
1918	7.42	3.07	10.49	6.00	4.49	6.21	3.65	2.56
1919	6.37	2.72	9.09	5.65	3.44	5.15	3.39	1.76
1920	10.15	3.40	13.55	7.73	5.82	7.94	4.90	3.04
1921	5.95	3.46	9.41	7.03	2.38	5.45	3.82	1.63
1922	6.59	3.32	9.91	6.81	3.10	5.84	4.05	1.79
1923	6.85	3.48	10.33	6.85	3.48	5.98	3.97	2.01
1924	5.76	3.51	9.27	5.95	3.32	4.70	3.44	1.26
1925	5.28	3.58	8.86	5.52	3.34	4.56	3.14	1.42
1926	5.65	3.52	9.17	5.55	3.62	4.57	3.08	1.49

[1] Includes operators' statements of the value of coke consumed by them in associated enterprises but not sold, except that in 1918 and 1920 the value of such coke was estimated for each State at the average value for that State of the part of the product reported sold.

PREPARATION AND SOURCE OF COAL CHARGED

TABLE 32.—*Washed and unwashed coal used in the manufacture of by-product and beehive coke, by States in which used, in 1926, in net tons*

State	Washed	Unwashed	Total
By-product ovens:			
Alabama	6,684,162	115,611	6,799,773
Colorado	859,725		859,725
Illinois		4,712,342	4,712,342
Indiana		7,994,696	7,994,696
Kentucky		[1]	[1]
Maryland		1,534,021	1,534,021
Massachusetts		874,053	874,053
Michigan	58,896	2,463,945	2,522,841
Minnesota		903,041	903,041
Missouri		[1]	[1]
New Jersey		1,260,372	1,260,372
New York	521,636	3,428,390	3,950,026
Ohio		10,962,723	10,962,723
Pennsylvania	1,724,837	15,170,233	16,895,070
Rhode Island		[1]	[1]
Tennessee	158,012	7,053	165,065
Utah		326,544	326,544
Washington		67,544	67,544
West Virginia		1,632,790	1,632,790
Wisconsin		[1]	[1]
Combined States		2,185,984	2,185,984
	10,007,268	53,639,342	63,646,610
Beehive ovens:			
Alabama	[1]		[1]
Colorado	21,476	285,535	307,011
Georgia		5,125	5,125
Kentucky		249,952	249,952
New Mexico	[1]		[1]
Ohio		125,883	125,883
Pennsylvania	1,880,863	14,463,576	16,344,439
Tennessee	215,579	68	215,647
Utah		203,750	203,750
Virginia	10,720	589,223	599,943
Washington	38,965	300	39,265
West Virginia	346,790	610,239	957,029
Combined States	176,456		176,456
	2,690,849	16,533,651	19,224,500

[1] Included under "Combined States."

TABLE 33.—*Coal consumed at beehive-coke plants in 1926, classified with respect to practice in crushing coal before charging, by States, in net tons*

State and district	At plants practicing crushing [1]	At plants not practicing crushing	Total
Colorado	285,535	21,476	307,011
Georgia		5,125	5,125
Kentucky	249,952		249,952
Ohio		125,883	125,883
Pennsylvania:			
Allegheny Mountain and Allegheny Valley district	130,276	65,493	195,769
Connellsville district	40,493	7,371,208	7,411,701
Lower Connellsville district	1,597,244	4,292,544	5,889,788
Pittsburgh district	878,281	126,004	1,004,285
Upper Connellsville district	382,777	310,676	693,453
Other districts	1,148,444	999	1,149,443
Total, Pennsylvania	4,177,515	12,166,924	16,344,439
Tennessee	182,378	33,269	215,647
Utah	203,750		203,750
Virginia	599,943		599,943
Washington		39,265	39,265
West Virginia:			
Flat Top district	181,660	118,182	299,842
Kanawha district	178,594		178,594
New River district	207,864	11,300	219,164
Upper Monongahela district	134,049	20,288	154,337
Upper Potomac and Tygarts Valley district	7,191	97,901	105,092
Total West Virginia	709,358	247,671	957,029
Alabama and New Mexico	176,456		176,456
Total United States	6,584,887	12,639,613	19,224,500

[1] Includes a small number of plants that reported charging slack or screenings.

As previously indicated, a large part of the coal used in the by-product plants of the country comes from Pennsylvania and West Virginia. In 1926 these two States supplied two-thirds of the coal used in by-product ovens during that year. Other important sources of by-product coal are Kentucky, Alabama, and Virginia. By-product coals are also mined in Tennessee, Colorado, Utah, and Washington, but under normal conditions these coals are used at near-by plants and are not shipped to plants in other States. Small quantities of Illinois and Indiana coal have also been coked in recent years, but the tonnage is apparently decreasing. Table 34 summarizes the replies of the operators as to the origin of the coal used in the manufacture of by-product coke in 1926. (See also fig. 21.)

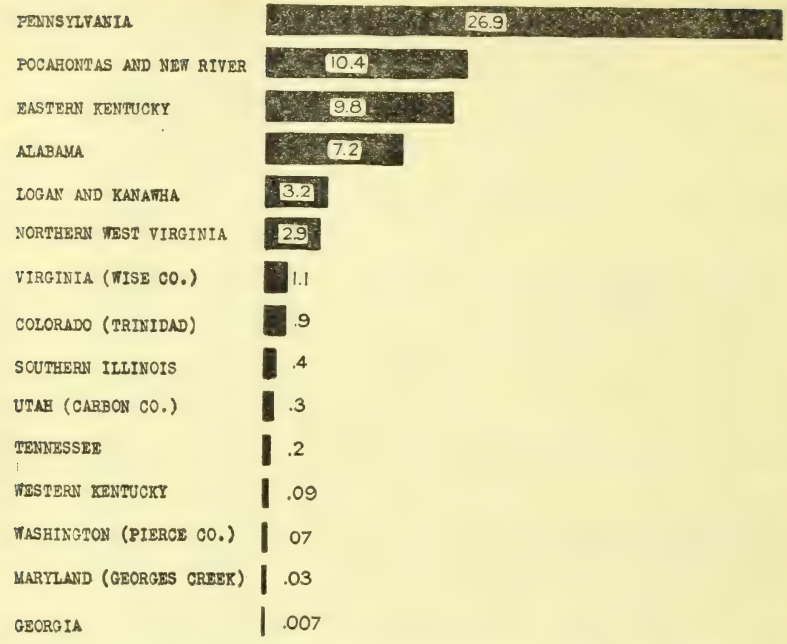

FIGURE 21.—Sources of coal purchased for use in by-product coke ovens in 1926, by State or district in which the coal was produced. Figures in bars represent million net tons

TABLE 34.—*Coal used in the manufacture of by-product coke in 1926, by field of origin, in net tons*

[Based upon detailed reports from each plant. As these reports on source of coal sometimes represent purchases made during the year they may differ slightly from the record of coal charged into ovens shown elsewhere]

State and district where coal was produced	Total used	State and district where coal was produced	Total used
Alabama	7,165,000	Pennsylvania—Continued.	
Colorado: Trinidad	972,000	Clearfield	160,000
Georgia	7,000	Broadtop	107,000
Illinois: Southern	446,000	Somerset	202,000
Kentucky:		Central and Western Pennsylvania, unspecified	5,707,000
West Kentucky	85,000	Tennessee	158,000
East Kentucky—		Utah: Carbon County	330,000
Elkhorn	3,196,000	Virginia: Wise County	1,053,000
Harlan, Pond Creek, and Alma	5,208,000	Washington: Pierce County	68,000
Unspecified	1,412,000	West Virginia:	
Maryland: Georges Creek	25,000	Northern	2,881,000
Pennsylvania:		Kanawha and Logan	3,176,000
Connellsville	15,135,000	Pocahontas and New River	10,460,000
Pittsburgh	4,291,000	Unspecified	541,000
Westmoreland	41,000	State not reported	11,000
Connellsville, Pittsburgh, and Westmoreland, unspecified	318,000		
Freeport	974,000		64,129,000

Table 35 shows the percentage of the total quantity of coal used in the manufacture of by-product coke that was mined in certain principal States during the last decade.

TABLE 35.—*Proportion of total quantity of coal used in the manufacture of by-product coke that was derived from specified States, 1916–17 and 1922–1926*

Year	Pennsylvania	West Virginia	Virginia	Kentucky	Illinois	Indiana
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1916	31.9	42.4	----------	10.3	----------	----------
1917	35.0	34.0	0.7	13.5	1.4	1.4
1922	34.7	28.0	1.9	17.5	2.0	1.1
1923	40.6	24.8	2.0	15.0	2.3	1.3
1924	44.5	19.8	2.0	16.4	1.5	----------
1925	41.3	26.2	1.4	15.4	.6	----------
1926	41.8	25.9	2.5	15.4	.7	----------

YIELD OF COKE PER TON OF COAL

TABLE 36.—*Percentage yield of coke from coal in by-product and beehive ovens, by States, 1923–1926*

State	1923		1924		1925		1926	
	By-product	Beehive	By-product	Beehive	By-product	Beehive	By-product	Beehive
Alabama	68.4	57.9	68.8	60.4	70.3	64.4	70.3	[1]
Colorado	68.6	65.0	69.3	64.2	69.3	64.8	69.0	64.2
Georgia	----------	52.0	----------	56.1	----------	56.9	----------	59.7
Illinois	69.4	----------	69.3	----------	71.3	----------	70.8	----------
Indiana	70.6	----------	73.3	----------	74.9	----------	74.9	----------
Kentucky	[1]	54.5	[1]	54.0	[1]	61.1	[1]	59.0
Maryland	73.4	----------	73.4	----------	73.4	----------	73.1	----------
Massachusetts	69.4	----------	69.2	----------	67.1	----------	65.6	----------
Michigan	72.1	----------	73.5	----------	71.5	----------	72.4	----------
Minnesota	69.6	----------	69.1	----------	65.4	----------	68.6	----------
New Jersey	74.3	----------	72.3	----------	72.8	----------	72.5	----------
New Mexico	----------	51.8	----------	61.0	----------	61.4	----------	[1]
New York	68.4	----------	70.7	----------	72.2	----------	71.6	----------
Ohio	68.1	65.0	67.9	65.0	68.7	64.8	68.9	67.5
Oklahoma	----------	52.1	----------	----------	----------	----------	----------	----------
Pennsylvania	68.5	65.3	67.1	65.4	67.1	65.7	66.3	65.6
Tennessee	72.3	54.5	73.3	52.9	70.6	63.7	71.9	56.8
Utah	----------	57.8	51.2	59.4	53.2	59.0	56.6	59.6
Virginia	----------	62.4	----------	63.0	----------	63.8	----------	61.8
Washington	56.7	68.2	56.2	64.3	59.3	61.5	63.0	62.9
West Virginia	67.2	60.7	67.3	61.7	69.2	60.9	69.2	61.0
Average	69.3	64.4	69.3	64.6	69.9	65.2	69.7	65.0

[1] Not at liberty to publish data.

COKE BREEZE

The manufacture of coke produces appreciable percentages of coke breeze or screenings too fine for metallurgical or household use. Logically this material should be considered part of the coke production because of its value as a fuel, which probably averages somewhat more than 12,000 British thermal units per pound on a dry basis. To include this material, however, would not conform to the general trade usage. Moreover, present and past production could not then be accurately compared, for the statistical records of breeze produced before 1916 are fragmentary. Hence, breeze is treated in this report as a by-product, and the term "coke" refers only to the larger material from which the screenings have been removed. The size of the material classed as breeze varies with the different plants, but it may be described roughly as corresponding to the steam sizes of anthracite.

Table 37 indicates that in the beehive branch of the industry the problem of finding a profitable outlet for breeze remains unsolved.

The quantity reported as produced in 1926 was only 218,342 tons, a small part of the total quantity of fine material resulting from the carbonization of the coal charged during the year. Limited amounts of the breeze produced in beehive ovens are used by the producer for steam raising and other purposes, and even smaller quantities are sold.

In the by-product industry uses can ordinarily be found for the breeze, and the amount wasted is negligible. As the low value per ton will not justify long rail hauls breeze is generally used at or near the producer's plant. Approximately 75 per cent of the breeze obtained at by-product plants is consumed by the producer, generally as a boiler fuel, and 25 per cent is sold to near-by consumers. By-product breeze is also utilized frequently as a fuel for gas producers, especially when the surplus gas of the plant is sold for city use, the producer gas being employed to heat the ovens.

TABLE 37.—*Coke breeze recovered at coke plants, by States, in 1926*

State	Yield (per cent) of coal)	Produced		Used for steam raising		Used for other purposes by producer		Sold		On hand Dec. 31 (net tons)	Wasted (net tons)
		Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value		
By-product ovens:											
Alabama	4.2	287,961	$480,471	206,390	$291,317	(1)	(1)	107,095	$232,293	27,856	(1)
Colorado	4.8	41,017	(1)	35,525	(1)	5,492	(1)				
Illinois	5.9	280,097	734,700	168,117	405,694	(1)	(1)	66,167	207,570	95,962	
Indiana	5.2	418,738	1,076,660	323,688	732,127	49,815	$119,172	35,886	201,636	17,656	
Maryland	7.5	114,545	(1)	32,747	(1)	20,955	(1)	48,670	(1)	52,087	
Massachusetts	7.6	66,373	(1)	48,787	(1)	4,008	(1)	11,905	(1)	4,770	
Michigan	5.9	149,152	507,671	64,467	195,161	3,474	13,865	74,637	270,670	16,536	
Minnesota	8.5	76,813	244,522	33,374	98,476	(1)	(1)	13,985	62,621	(1)	
New Jersey	4.5	56,476	(1)	53,836	(1)			3,790	(1)	574	
New York	4.5	179,153	383,892	158,393	330,128	(1)	(1)	31,830	72,678	15,121	
Ohio	7.0	768,669	1,460,952	547,858	756,530	(1)	(1)	163,577	664,175	84,775	
Pennsylvania	8.5	1,440,506	3,033,965	858,705	1,396,316	218,293	324,989	308,132	1,183,468	80,507	
Tennessee	3.5	1,000	1,000	1,000	1,000						
Utah	11.5	37,566	138,619					26,614	98,136	30,267	
Washington	6.2	4,195	4,195	140	140	4,051	4,051	4	4		
West Virginia	5.8	94,857	142,129	55,016	71,390	8,751	14,216	26,113	52,892	[illegible]	
Kentucky, Missouri, Rhode Island, and Wisconsin	7.6	166,335	332,330	106,531	179,576	13,926	34,092	17,887	46,434	23,114	(1)
Undistributed			692,123		415,531	62,431	212,025		189,099	18,156	47,376
	6.6	4,183,453	9,233,229	2,694,574	4,873,386	391,196	722,410	936,292	3,281,676	467,381	47,376
Beehive ovens:											
Colorado and Utah	[2] 1.3	4,001	21,256			11	57	3,990	21,210		
Ohio, Tennessee, and Virginia	[2] 1.9	12,130	22,586	1,000	100			4,310	12,326	2,858	4,000
Pennsylvania	[2] 2.9	195,428	599,879	43,605	59,951	1,335	1,744	35,216	133,553	500	30,561
West Virginia	[2] 3.5	6,783	4,472	6,363	3,182						420
	[2] 2.8	218,342	648,193	50,968	63,233	1,346	1,801	43,516	167,089	3,358	[3] 34,981

[1] Included under "Undistributed."
[2] Yield computed by dividing the production of breeze at the few plants reporting by the quantity of coal charged at those plants.
[3] As reported; quantity produced but not used was undoubtedly greater. See Mineral Resources, 1922, pt. 2, pp. 726–727.

FURNACE, FOUNDRY, AND DOMESTIC COKE

Source of information.—Tables 38 to 41 analyze the replies of the producers to the following questions, which have been used with minor changes since 1923.

Disposal of coke (excluding breeze)	Net tons	Value at ovens
Used in blast furnaces or affiliated works (not sold)		
Sold for furnace use—		
To financially affiliated corporations		
To other merchant consumers		
Sold for foundry use		
Sold for other industrial use		
Sold for domestic use		

In considering these tables it should be remembered that the terms "furnace" and "foundry" coke are often used in the trade to designate physical or chemical properties of the coke as well as the use to which the product is put. (See "Coke and By-products in 1922," pp. 729–730.) Not all beehive coke sold under the name of "foundry coke," for example, finds its way to foundrymen. Because of the way in which the question is phrased, however, it is believed that the replies of the operators here summarized give with reasonable accuracy the quantities sold for use in furnace, foundry, and other industrial operations, and for domestic purposes. The quantity "used by the producer not sold," is not subdivided according to use. The great bulk of this is known to be "furnace" coke used in iron blast furnaces, but the item also includes considerable tonnages used for steam generating or producer gas around the coke plant or associated steel works, a certain amount used by western metal-mining companies for smelting the nonferrous metals, a small tonnage used in alkali manufactories associated with the coke plants, and a small, though increasing quantity, consumed to make producer gas or water gas at coke plants producing gas for city supply.

By-product coke in 1926.—In 1926 the producers of by-product coke reported sales of 12,581,578, of which 2,127,176 tons was furnace coke sold to affiliated corporations, 1,566,980 tons furnace coke sold to nonaffiliated purchasers (merchant sales), 2,168,017 tons foundry coke, 1,662,837 tons coke destined for other industrial uses, and 5,056,568 tons sold for domestic use. (Table 38.)

The quantity not sold but used by the producers themselves was 31,334,305 tons. Out of this about 429,000 tons was used in affiliated alkali works or consumed in gas producers or water-gas generators at plants supplying coke-oven gas for city distribution. The remainder, amounting to 30,905,000 tons, was consumed in blast furnaces or for other uses connected with associated metallurgical works.

The total quantity distributed in 1926, including sales and the amount used by the producer, was thus 43,915,883 tons, or slightly less than the total production. The balance was carried over in storage to the following year.

TABLE 38.—*By-product coke produced and sold or used by the producer, by States, in 1926*

[Exclusive of screenings and breeze]

State	Produced		Sold					
			Furnace				Foundry	
	Net tons	Value	To affiliated corporations		Merchant sales		Net tons	Value
			Net tons	Value	Net tons	Value		
Alabama	4,779,986	$16,823,492	(1)	(1)	68,085	$308,242	446,433	$2,376,580
Colorado	592,939	(1)						
Illinois	3,336,962	25,050,474			302,578	2,164,339	240,068	2,187,193
Indiana	5,990,344	44,143,059	(1)	(1)	(1)	(1)	(1)	(1)
Maryland	1,120,610	(1)						
Massachusetts	573,748	(1)	43,572	(1)			192,467	(1)
Michigan	1,826,638	12,713,083	(1)	(1)	(1)	(1)	(1)	(1)
Minnesota	619,905	6,014,738					(1)	(1)
New Jersey	913,250	(1)					(1)	(1)
New York	2,827,805	17,455,226	563,767	$2,862,955	92,186	597,016	(1)	(1)
Ohio	7,547,836	40,344,524	789,201	4,033,504	206,396	1,167,627	87,519	632,209
Pennsylvania	11,200,624	48,722,935	698,537	3,625,552	142,336	782,923	(1)	(1)
Tennessee	118,624	628,482					6,927	46,563
Utah	184,756	(1)			37,322	(1)		
Washington	42,584	303,624						
West Virginia	1,129,862	4,265,884			(1)	(1)	(1)	(1)
Kentucky, Missouri, Rhode Island, and Wisconsin	1,570,113	11,621,482			351,666	2,262,953	454,707	3,797,232
Undistributed		22,661,530	32,099	435,108	366,411	2,517,199	739,896	7,796,599
	44,376,586	250,748,533	2,127,176	10,955,119	1,566,980	9,800,299	2,168,017	16,836,376

(1) Included under "Undistributed."

TABLE 38.—*By-product coke produced and sold or used by the producer, by States, in 1926*—Continued

State	Sold—Continued						Used by producer in blast furnace, etc.	
	Domestic use		Industrial and other use		Total			
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Alabama	153,302	$668,699	(1)	(1)	804,462	$3,939,228	3,878,770	$12,553,675
Colorado			18,985	(1)	18,985	(1)	574,075	(1)
Illinois	853,866	6,247,920	235,804	$2,252,924	1,632,316	12,852,376	1,717,860	12,125,522
Indiana	298,041	1,678,543	119,761	847,473	672,671	4,759,732	5,293,817	39,188,968
Maryland	52,106	(1)	121,135	(1)	173,241	(1)	942,663	(1)
Massachusetts	319,478	(1)			555,517	(1)	14,795	(1)
Michigan	741,249	5,611,961	(1)	(1)	1,153,751	8,477,333	563,236	3,428,735
Minnesota	(1)	(1)	8,865	79,108	348,218	3,406,447	282,040	2,732,527
New Jersey	(1)	(1)	549,692	(1)	820,288	(1)	76,020	(1)
New York	589,964	5,075,972	(1)	(1)	1,561,699	11,089,967	1,196,574	5,845,404
Ohio	458,783	2,969,357	39,395	241,561	1,581,294	9,042,258	5,914,506	31,073,911
Pennsylvania	320,658	2,152,438	(1)	(1)	1,232,218	6,962,004	9,958,566	41,701,852
Tennessee	9,351	47,403	98,195	513,024	114,473	606,990		
Utah					37,322	(1)	147,657	(1)
Washington	3,855	32,793			3,855	32,793	39,536	276,731
West Virginia	84,428	282,869	4,469	20,054	332,415	1,487,920	717,907	2,420,980
Kentucky, Missouri, Rhode Island, and Wisconsin	678,174	5,025,112	54,306	365,853	1,538,853	11,451,150	16,283	130,001
Undistributed	493,313	7,774,592	412,230	7,965,215		13,336,467		9,127,822
	5,056,568	37,567,659	1,662,837	12,285,212	12,581,578	87,444,665	31,334,305	160,606,129

[1] Included under "Undistributed."

Beehive coke distributed in 1926.—Corresponding data for beehive coke are given in Table 39. In 1926 the total sales amounted to 10,929,562 tons, including 4,260,028 tons of furnace coke sold to affiliated corporations, 4,156,032 tons of "merchant sales" for furnace use, 1,163,660 tons for foundry use, 963,797 tons for other industrial uses, and 386,045 tons sold for domestic purposes.

The quantity of beehive coke used by the producers themselves was 1,575,039 tons. Of this approximately 1,549,000 tons was consumed in blast furnaces or in other operations at associated iron and steel works, and 26,000 tons was used in other affiliated industries, chief of which was smelting of the nonferrous metals.

TABLE 39.—*Beehive coke produced and sold or used by the producer, by States, in 1926*

[Exclusive of screenings and breeze]

State	Produced		Sold					
			Furnace				Foundry	
	Net tons	Value	To affiliated corporations		Merchant sales		Net tons	Value
			Net tons	Value	Net tons	Value		
Colorado	197,179	(1)	134,228	(2)			2,949	(2)
Georgia	3,059	$23,034					2,938	$22,135
Kentucky	147,540	600,169					82,375	274,776
Ohio	84,970	(1)						
Pennsylvania	10,722,352	47,595,184	4,026,041	$18,728,618	3,775,075	$14,322,023	761,422	3,991,973
Tennessee	122,410	605,017			28,795	129,869	10,511	61,377
Utah	121,475	1,033,284			121,475	1,033,284		
Virginia	370,983	1,716,716	48,823	184,434	18,599	75,611	110,680	557,918
Washington	24,702	214,429						
West Virginia	583,599	2,652,219			212,088	823,219	184,824	993,291
Alabama and New Mexico	110,682	730,590	50,936	[3] 1,393,401			7,961	[3] 66,466
Undistributed		1,854,227						
	12,488,951	57,024,869	4,260,028	20,306,453	4,156,032	16,384,006	1,163,660	5,967,936

State	Sold—Continued						Used by producer in blast furnace, etc.	
	Domestic use		Industrial and other use		Total		Net tons	Value
	Net tons	Value	Net tons	Value	Net tons	Value		
Colorado	17,321	(2)			154,498	(3)	42,621	(1)
Georgia					2,938	$22,135		
Kentucky			519	$1,849	82,894	276,625	64,196	$320,980
Ohio							83,035	(1)
Pennsylvania	343,787	$2,375,582	643,549	3,046,309	9,549,874	42,464,505	1,177,699	5,167,878
Tennessee			500	1,250	39,806	192,496	83,158	415,790
Utah					121,475	1,033,284		
Virginia	4,120	29,434	167,370	775,676	349,592	1,623,073	19,322	82,217
Washington			24,702	214,429	24,702	214,429		
West Virginia	20,668	127,216	86,948	363,521	504,528	2,307,247	93,321	426,407
Alabama and New Mexico	149	[2] 145,509	40,209	235,508	99,255	[2] 1,840,884	11,687	63,235
Undistributed								672,454
	386,045	2,677,741	963,797	4,638,542	10,929,562	49,974,678	1,575,039	7,148,961

[1] Included under "Undistributed."

[2] Colorado included with Alabama and New Mexico.

Relative growth of furnace, foundry, and domestic coke.—A development of particular interest in recent years in the coke trade has been the increased use of coke for household heating, largely the result of disturbances in the normal supply of anthracite that have induced domestic consumers to resort to other fuels. Coke is now firmly

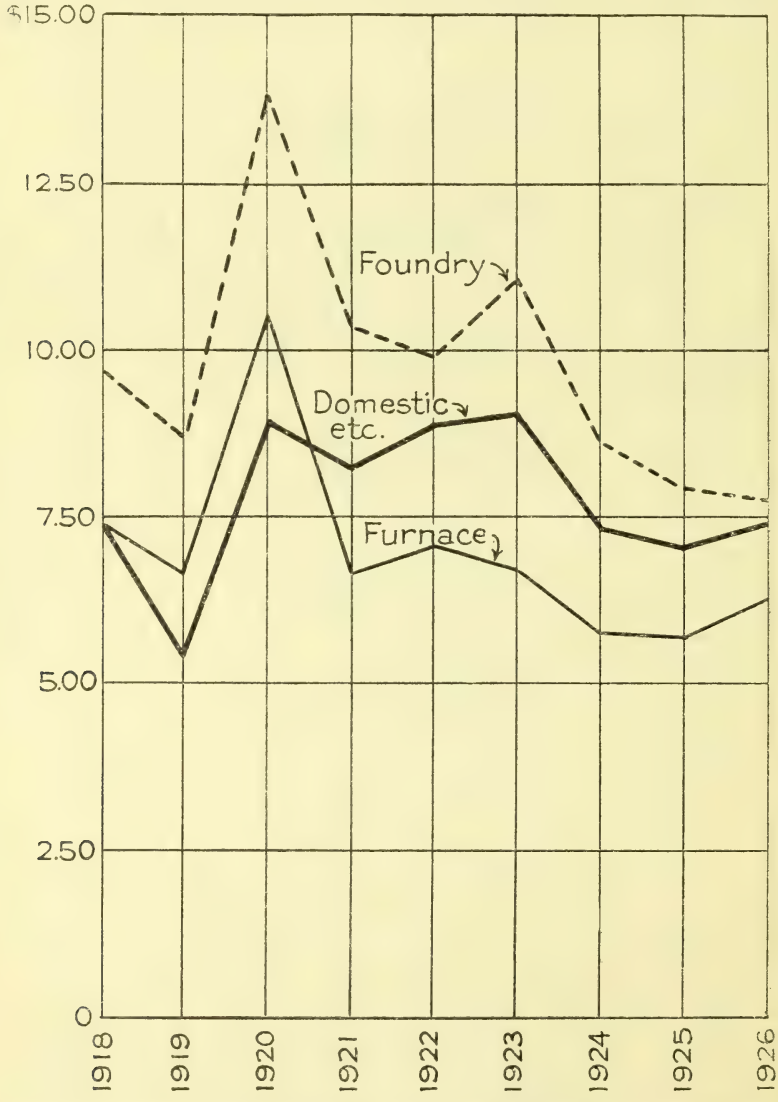

FIGURE 22.—Average realization on sales of by-product coke for furnace, foundry, and domestic and miscellaneous industrial use, 1918–1926

established in the domestic market and has demonstrated that when properly prepared and fired it makes an excellent and economical household fuel.

As the construction of new by-product plants now depends chiefly on the degree to which the market for house fuel can be expanded,

special interest attaches to the rate at which the sales for domestic use have been increasing. Tables 40 and 41 have been compiled, in response to many requests, in order to show the relative growth of the demand for furnace, foundry, and domestic uses over as long a period as possible.

Table 40 shows the sales so classified and the quantity used by the producer for each year from 1918 to 1926. From 1918 to 1922 the operators were merely asked to state the total quantity of furnace, of foundry, and of domestic coke sold. For the years 1923 to 1926 the figures are based on the replies to the detailed questions listed on page 624. The change in form of inquiry affects the comparability of the figures before 1923, but for 1923 to 1926 they are exactly comparable.

The movement of prices for the several grades of coke is indicated by the figures of average value per ton at the bottom of Table 40. (See also fig. 22.) Since 1920 the general trend of sales realizations has been downward, but the values obtained for domestic coke have compared more favorably with those for metallurgical coke than before. The curve of sales realizations on domestic coke (including sales for "other industrial use") shows the influence of the anthracite shortages of 1922–23 and 1926.

TABLE 40.—*Coke used by producer and sold for furnace, foundry, other industrial, and domestic use, 1918–1926*

[Exclusive of screenings and breeze]

Year	Used by producer in blast furnace or other affiliated works	Sold					
		Furnace		Foundry	Other industrial use	Domestic	Total sales
		To affiliated corporations	Merchant sales				
Quantity (net tons):							
By-product—							
1918	17,753,348	4,147,695		1,631,052	2,587,059		8,365,806
1919	17,767,066	4,677,497		1,480,516	2,885,270		9,043,283
1920	22,848,461	4,054,964		1,715,982	2,361,737		8,132,683
1921	13,470,396	2,593,318		736,391	1,679,911		5,009,620
1922	21,106,823	2,934,924		1,601,733	3,865,751		8,402,408
1923	27,055,397	2,313,412	1,460,538	1,897,955	1,638,220	2,637,518	9,947,643
1924	24,023,933	2,335,056	1,590,983	1,553,849	1,556,175	2,812,771	9,848,834
1925	28,223,838	2,641,729	1,736,112	1,833,372	2,072,635	4,085,068	12,368,916
1926	31,334,305	2,127,176	1,566,980	2,168,017	1,662,837	5,056,568	12,581,578
Beehive—							
1918	4,885,318	23,216,627		2,230,156	210,513		25,657,294
1919	3,023,828	14,574,264		1,340,483	143,930		16,067,677
1920	3,204,884	[1] 15,188,814		1,807,256	102,142		[1] 17,188,212
1921	495,481	3,957,709		1,011,343	56,874		5,025,926
1922	1,071,886	6,105,903		1,164,716	179,670		7,449,889
1923	2,583,507	7,923,783	6,437,771	1,702,764	645,662	95,896	16,805,876
1924	1,574,037	3,582,004	3,357,433	1,363,952	260,040	139,886	8,703,314
1925	2,032,944	3,479,728	3,895,983	1,153,665	572,949	392,608	9,495,033
1926	1,575,039	4,260,028	4,156,032	1,163,660	903,797	386,045	10,869,562
Total—							
1918	22,638,666	27,364,322		3,861,208	2,747,570		33,973,100
1919	20,790,894	19,251,761		2,820,999	3,029,200		25,110,960
1920	26,053,345	[1] 19,243,778		3,523,238	2,463,879		[1] 25,320,895
1921	13,965,877	6,551,027		1,747,734	1,736,785		10,035,546
1922	22,178,709	9,039,927		2,766,449	4,045,421		15,851,797
1923	29,638,904	10,237,195	7,898,309	3,600,719	2,283,882	2,733,414	28,753,519
1924	25,597,970	5,917,060	4,948,416	2,917,801	1,816,221	2,952,657	18,552,155
1925	30,256,782	6,121,457	5,632,095	2,987,037	2,645,584	4,477,766	21,863,939
1926	32,909,344	6,387,204	5,723,012	3,331,677	2,566,634	5,442,613	23,451,140

[1] Revised figures.

TABLE 40.—*Coke used by producer and sold for furnace, foundry, other industrial, and domestic use, 1918–1926*—Continued

Year	Used by producer in blast furnace or other affiliated works	Sold					
		Furnace		Foundry	Other industrial use	Domestic	Total sales
		To affiliated corporations	Merchant sales				
Total value:							
By-product—							
1918	[2]	$30,792,247		$15,849,017	$18,907,079		$65,548,343
1919	[2]	31,028,251		12,865,927	15,607,752		59,501,930
1920	[2]	42,841,222		23,678,225	21,080,429		87,599,876
1921	[2]	17,202,994		7,662,781	13,809,165		38,674,940
1922	[2]	20,636,494		15,921,431	34,407,054		70,964,979
1923	$168,379,600	$16,307,054	$9,847,055	19,995,342	$14,845,652	$23,872,007	84,867,110
1924	125,838,387	13,495,287	9,149,521	13,425,334	11,854,698	20,063,417	67,988,257
1925	134,245,288	13,794,422	9,954,964	14,630,450	14,849,829	28,521,425	81,751,090
1926	160,606,129	10,955,119	9,800,299	16,836,376	12,285,212	37,567,659	87,444,665
Beehive—							
1918	[2]	$137,782,308		16,802,144	$1,319,053		155,903,505
1919	[2]	72,007,820		8,364,256	775,467		81,147,543
1920	[2]	108,943,650		17,209,737	1,545,147		127,698,534
1921	[2]	20,979,386		5,932,599	272,412		27,184,397
1922	[2]	33,724,440		8,334,400	1,086,014		43,144,854
1923	14,045,646	$45,756,993	$39,326,693	12,259,196	$4,112,236	$461,971	101,917,089
1924	7,872,356	17,706,496	13,507,138	7,543,143	1,052,249	509,333	40,318,359
1925	9,502,959	16,497,801	15,722,122	5,971,595	2,494,947	2,240,546	42,927,011
1926	7,148,961	20,306,453	16,384,006	5,967,936	4,638,542	2,677,741	49,974,678
Total—							
1918	[2]	$168,574,555		32,651,161	$20,226,132		221,451,848
1919	[2]	103,036,071		21,230,183	16,383,219		140,649,473
1920	[2]	151,784,872		40,887,962	22,625,576		215,298,410
1921	[2]	38,182,380		13,595,380	14,081,577		65,859,337
1922	[2]	54,360,934		24,255,831	35,493,068		114,109,833
1923	182,425,246	$62,064,047	$49,173,748	32,254,538	$18,957,888	$24,333,978	186,784,199
1924	133,710,743	31,201,783	22,656,659	20,968,477	12,906,947	20,572,750	108,306,616
1925	143,748,247	30,292,223	25,677,086	20,602,045	17,344,776	30,761,97'	124,678,101
1926	167,755,090	31,261,572	26,184,305	22,804,312	16,923,754	40,245,400	137,419,343
Value per ton:							
By-product—							
1918	[2]	$7.42		$9.72	$7.45		$7.88
1919	[2]	6.63		8.69	5.41		6.58
1920	[2]	10.57		13.80	8.93		10.77
1921	[2]	6.63		10.41	8.22		7.72
1922	[2]	7.03		9.94	8.90		8.45
1923	$6.22	$7.05	$6.74	10.54	$9.06	$9.05	8.53
1924	5.24	5.78	5.75	8.64	7.62	7.13	6.90
1925	4.76	5.22	5.73	7.98	7.16	6.98	6.61
1926	5.13	5.15	6.25	7.77	7.39	7.43	6.95
Beehive—							
1918	[2]	$5.93		7.53	$6.27		6.08
1919	[2]	4.94		6.20	5.39		5.05
1920	[2]	[1] 7.17		9.52	8.04		7.43
1921	[2]	5.30		5.87	4.79		5.41
1922	[2]	5.52		7.15	6.04		5.79
1923	5.44	$5.77	$6.11	7.20	$6.37	$4.82	6.06
1924	5.00	4.94	4.02	5.53	4.05	3.64	4.63
1925	4.67	4.74	4.04	5.18	4.35	5.71	4.52
1926	4.54	4.77	3.94	5.13	4.81	6.94	4.57
Total—							
1918	[2]	$6.16		8.46	$7.36		6.52
1919	[2]	5.35		7.50	5.41		5.60
1920	[2]	[1] 7.89		11.61	8.86		8.50
1921	[2]	5.83		7.78	8.11		6.56
1922	[2]	6.01		8.77	8.77		7.20
1923	5.15	$6.06	$6.23	8.96	$8.30	$8.90	6.98
1924	5.22	5.27	4.58	7.19	7.11	6.97	5.84
1925	4.75	4.95	4.56	6.90	6.56	6.87	5.70
1926	5.10	4.89	4.58	6.84	6.44	7.39	5.84

[1] Revised figures.

[2] No data.

Table 41 continues the analysis by grouping the sales of furnace coke and the quantity reported as "used by producer." Although, as explained in the footnote of the table, the total includes small amounts of coke used for other purposes, it may be taken as roughly equivalent to the demand for furnace coke.

In 1915 the demand for furnace coke calculated in this way, including both beehive and by-product coke, was about 36,703,000 tons and in 1916 about 47,875,000 tons. In 1926 it was 45,020,000 tons, an increase over 1915 but a slight decrease when compared with 1916. The demand for furnace coke has thus shown no permanent increase during the last decade.

The sales of foundry coke, including both beehive and by-product coke, were 1,665,000 tons in 1915 and 2,680,000 tons in 1916, but as the figures for these two years do not include exports they are not strictly comparable with those for the rest of the period. In 1918 the total sales of foundry coke, including the exports, were 3,861,000 tons in comparison with which the sales of 3,332,000 tons in 1926 show a decrease. It therefore appears that the demand for foundry coke also has shown no marked change during the last decade.

In contrast with the stationary demand for metallurgical coke the quantities sold for domestic and miscellaneous industrial uses have increased from three to four fold during the same period. Total sales for domestic and miscellaneous industrial uses in 1916, including both beehive and by-product coke but excluding a small amount exported, were 2,616,000 tons. In 1918, including the exports, they were 2,748,000 tons, from which level they increased to the maximum of 8,069,000 in 1926.

Beginning with 1923 the miscellaneous industrial sales can be segregated from the sales for domestic purposes and the growth of the domestic demand can be measured exactly. In 1923, a year when anthracite was in short supply, the sales of coke for domestic purposes totaled 2,733,000 tons. In the following year the supply of anthracite was ample, yet the sales of domestic coke increased and amounted to 2,953,000 tons. The growth of domestic demand was further stimulated by the anthracite suspension of 1925–26, and the sales rose to 4,478,000 in 1925 and to 5,443,000 in 1926.

Most of the sales for domestic use have been by-product coke. Beehive coke is less suitable for the domestic market, both because of its chemical properties and because as a rule the beehive ovens are not properly equipped for sizing their output to meet the requirements of the domestic consumer. Thus, the sales of domestic beehive coke in 1926 amounted to only 386,000 tons, a large increase over the sales of beehive in 1923, but less than one-twelfth of the sales of domestic by-product coke in 1926.

TABLE 41.—*Recapitulation of total supply of coke classified as furnace, foundry, other industrial, and domestic, 1915–1926* [1]

[Exclusive of screenings and breeze]

Year	Furnace (including all coke used by producer)[2]	Foundry	Other industrial and domestic			Total sold and used by producer[3]
			Other industrial (not including coke used by producer)	Domestic	Total	
By-product:						
1918	21,901,043	1,631,052	(4)	(4)	2,537,059	26,069,154
1919	22,444,563	1,480,516	(4)	(4)	2,885,270	26,810,349
1920	26,903,425	1,715,982	(4)	(4)	2,361,737	30,981,144
1921	16,063,714	736,391	(4)	(4)	1,679,911	18,480,016
1922	24,041,747	1,601,733	(4)	(4)	3,865,751	29,509,231
1923	30,829,347	1,897,955	1,638,226	2,637,518	4,275,744	37,002,046
1924	27,949,972	1,553,849	1,556,175	2,812,771	4,368,946	33,872,767
1925	32,601,679	1,833,372	2,072,635	4,085,068	6,157,703	40,592,754
1926	35,028,461	2,168,017	1,662,837	5,056,568	6,719,405	43,915,883
Beehive:						
1918	28,101,945	2,230,156	(4)	(4)	210,511	30,542,612
1919	17,598,092	1,349,483	(4)	(4)	143,930	19,091,505
1920	[5] 18,393,698	1,807,256	(4)	(4)	192,142	[5] 20,393,096
1921	4,453,190	1,011,343	(4)	(4)	56,874	5,521,407
1922	7,176,889	1,164,716	(4)	(4)	179,670	8,521,275
1923	16,945,061	1,702,764	645,662	95,896	741,558	19,389,383
1924	8,513,474	1,363,952	260,046	139,886	399,932	10,277,358
1925	9,408,655	1,153,665	572,949	392,698	965,647	11,527,967
1926	9,991,099	1,163,660	963,797	386,045	1,349,842	12,504,601
Total:						
1915	36,702,573	1,664,548	(4)	(4)	1,974,102	40,341,223
1916	47,875,153	2,680,104	(4)	(4)	2,616,320	53,171,577
1918	50,002,988	3,861,208	(4)	(4)	2,747,570	56,611,766
1919	40,042,655	2,829,999	(4)	(4)	3,029,200	45,901,854
1920	[5] 45,297,123	3,523,238	(4)	(4)	2,553,879	[5] 51,374,240
1921	20,516,904	1,747,734	(4)	(4)	1,736,785	24,001,423
1922	31,218,636	2,766,449	(4)	(4)	4,045,421	38,030,506
1923	47,774,408	3,600,719	2,283,888	2,733,414	5,017,302	56,392,429
1924	36,463,446	2,917,801	1,816,221	2,952,657	4,768,878	44,150,125
1925	42,010,334	2,987,037	2,645,584	4,477,766	7,123,350	52,120,721
1926	45,019,560	3,331,677	2,626,634	5,442,613	8,069,247	56,420,484

[1] For 1915 and 1916 separate figures for by-product and beehive coke are not available; the total, however, is shown. For 1917 no data on this subject were collected.

[2] Sales of furnace coke plus the total quantity reported "used by producer." Includes coke consumed at associated iron and steel works for other than blast-furnace use, and also a small quantity consumed for purposes that have no relation to the manufacture of iron and steel, such as alkali manufacture, smelting nonferrous metals, and making water gas and producer gas at plants supplying gas for city distribution. The quantity used for these other purposes in 1926 was about 429,000 tons of by-product coke and 26,000 tons of beehive coke.

[3] These figures represent the quantity distributed in the year without taking into account changes in producers' stocks, and therefore differ slightly from the published totals of production. In 1915 and 1916, moreover, they do not include the quantity exported.

[4] Not separated prior to 1923.

[5] Revised figures.

STOCKS OF COKE

Since 1922 statistics have been collected at intervals covering the amount of coke in storage at a group of 21 by-product plants supplying gas for city use and producing a coke suitable for household fuel. These figures have been published in conjunction with the bureau's periodic survey of coal stocks. They are given in Table 42 and Figure 18 for every date on which information is available.

At the beginning of 1926 stocks of unsold coke at the 21 plants stood at 248,000 tons. With the continuation of the anthracite strike these small reserves rapidly dwindled to the lowest point on record, and on April 1, six weeks after the settlement of the strike, the amount on hand totaled only 53,000 tons. After the end of the heating season the demand for coke declined and stocks rapidly increased, reaching 628,000 tons on October 1. With the coming of

cold weather demand again exceeded production, and in the last quarter of the year the storage piles were gradually reduced.

TABLE 42.—*Stocks of unsold coke at 21 by-product coke plants, supplying gas for city use, 1922–1926, in net tons*

1922	
Jan. 1	1,017,000
Mar. 1	987,000
Oct. 1	250,000
Nov. 1	228,000
1923	
Jan. 1	212,000
Feb. 1	146,000
Mar. 1	92,000
June 1	202,000
July 1	308,000
Aug. 1	[1] 430,000
Sept. 1	501,000
Oct. 1	476,000
1924	
Jan. 1	772,000
Sept. 1	1,114,000
1925	
Mar. 1	631,000
June 1	722,000
Sept. 1	865,000
Nov. 1	623,000
1926	
Jan. 1	248,000
Feb. 1	90,000
Apr. 1	53,000
May 1	151,000
July 1	334,000
Aug. 1	470,000
Oct. 1	628,000
Nov. 1	579,000
Dec. 31	516,000

Details of stocks of both beehive and by-product coke held by all producers at the end of the year, including the stocks of the 21 plants already mentioned, are given in Table 43. On December 31, 1926, the by-product plants reported a total of 532,831 tons of furnace coke, 37,414 tons of foundry coke, 697,135 tons of domestic and other coke, and 467,381 tons of breeze. Stocks at the beehive ovens were comparatively small.

TABLE 43.—*Stocks of coke and of breeze at the end of 1926, by States, in net tons*

State	Furnace	Foundry	Domestic and other	Breeze
By-product plants:				
Alabama	375,751	(a)	6,670	27,856
Colorado	3,502			
Illinois	4,509	(a)	121,359	95,962
Indiana	11,264	(a)	47,809	17,656
Maryland	8,903		140	52,087
Massachusetts	592	1,365	10,088	4,770
Michigan	(a)	(a)	160,077	16,536
Minnesota	(a)	(a)	(a)	(a)
New Jersey			34,301	574
New York	16,309	(a)	92,226	15,124
Ohio	52,079	(a)	91,536	84,775
Pennsylvania	40,284		6,291	80,507
Tennessee		180	4,147	
Utah	3,986		16,060	30,267
Washington		10,843		
West Virginia	1,947		(a)	(a)
Kentucky, Missouri, Rhode Island, and Wisconsin	11,825	(a)	72,770	23,114
Undistributed	1,880	25,026	33,951	18,156
	532,831	37,414	697,135	467,381
Beehive plants:				
Colorado	1,555			
Georgia		160		
Kentucky	450			
Ohio	1,874		34	2,820
Pennsylvania	14,423	3,974	3,435	500
Tennessee	3,731	371		
Virginia	3,262	411	2,277	38
West Virginia	130	1,974	700	
	25,425	6,890	6,446	3,358

[a] Included under "Undistributed."

[1] Revised figures.

CONSUMPTION OF COKE

According to figures compiled by the American Iron and Steel Institute the quantity of coke consumed in 1926 by the iron furnaces (excluding the amount used in the manufacture of ferro-alloys) was 39,708,845 net tons, or about 71 per cent of the indicated consumption of by-product and beehive coke. (Table 44.) The noteworthy improvement in efficiency of fuel utilization in blast-furnace operation during recent years is shown in Table 45. The quantity of coking coal required to make a gross ton of pig iron declined from an average of 3,637.2 pounds in 1913 to the low record of 3,004.2 pounds in 1926.

The consumption of coke for purposes other than iron manufacture has increased notably in recent years. In 1913 the total used for nonfurnace purposes was 8,221,060 tons, or 18.1 per cent of the total; in 1926 it had grown to 16,453,980 tons, or 29.3 per cent of the total.

TABLE 44.—*Quantity of coke consumed in the manufacture of pig iron and for other purposes, 1913–1926, in net tons*

Year	Total production of coke	Imports	Exports	Indicated United States consumption	Consumed by iron furnaces [1]		Remainder consumed in other ways [2]	
					Quantity	Per cent	Quantity	Per cent
1913	46, 299, 530	101, 212	987, 395	45, 413, 347	37, 192, 287	81. 9	8, 221, 060	18. 1
1914	34, 555, 914	133, 226	663, 585	34, 025, 555	27, 070, 856	79. 6	6, 954, 699	20. 4
1915	41, 581, 150	53. 222	895, 509	40, 738, 863	33, 224, 328	81. 6	7, 514, 535	18. 4
1916	54, 533, 585	54, 955	1, 174, 645	53, 413, 895	44, 431, 905	83. 2	8, 981, 990	16. 8
1917	55, 606, 828	24, 872	1, 409, 320	54, 222, 380	44, 493, 316	82. 1	9, 729, 064	17. 9
1918	56, 478, 372	30, 168	1, 687, 824	54, 820, 716	45, 703, 594	83. 4	9, 117, 122	16. 6
1919	44 180, 557	16, 486	716, 956	43. 480, 087	35, 250, 943	81. 1	8, 229, 144	18. 9
1920	51, 345, 043	41, 143	919, 802	50, 466, 384	41, 976, 171	83. 2	8, 490, 213	16. 8
1921	25, 287, 622	30, 990	306, 755	25, 011, 857	18, 162, 147	72. 6	6, 849, 710	27. 4
1922	37, 124, 012	94, 228	511, 541	36, 706, 699	29, 213, 893	79. 6	7, 492, 806	20. 4
1923	56, 977, 534	85, 002	1, 237, 342	55, 825, 194	44, 761, 526	80. 2	11, 063, 668	19. 8
1924	44, 269, 605	82, 833	659, 350	43, 693, 088	34, 303, 060	78. 5	9, 390, 028	21. 5
1925	51, 266, 943	201, 579	953, 812	50, 514, 710	39, 241, 812	77. 7	11, 272, 898	22. 3
1926	56, 865, 537	284, 548	987, 260	56, 162, 825	[3] 39, 708, 845	70. 7	16, 453, 980	29. 3

[1] From Annual Report of American Iron and Steel Institute.
[2] Includes changes in stocks.
[3] Excludes coke consumed in the manufacture of ferro-alloys.

TABLE 45.—*Pounds of coke and of coking coal consumed per gross ton of pig iron made in the United States, 1913–1926*

Year	Pounds of coke per gross ton of pig [1]	Per cent yield of coke from coal	Calculated pounds coking coal per gross ton of pig	Year	Pounds of coke per gross ton of pig [1]	Per cent yield of coke from coal	Calculated pounds coking coal per gross ton of pig
1913	2, 433. 3	66. 9	3, 637. 2	1920	2. 305. 6	67. 4	3, 420. 8
1914	2, 354. 4	66. 9	3, 519. 3	1921	2. 200. 6	68. 0	3, 236. 2
1915	2, 252. 0	67. 2	3, 351. 2	1922	2, 176. 3	68. 3	3, 186. 4
1916	2, 285. 3	66. 8	3, 421. 1	1923	2, 243. 3	67. 5	3, 323. 4
1917	2, 339. 7	66. 4	3, 523. 6	1924	2, 212. 0	68. 1	3, 248. 2
1918	2, 375. 2	66. 4	3, 577. 1	1925	2, 150. 4	68. 8	3, 125. 6
1919	2, 310. 2	67. 4	3, 427. 6	1926	[2] 2, 060. 9	68. 6	3, 004. 2

[1] From Annual Report of American Iron and Steel Institute.
[2] Excludes coke consumed in manufacture of ferro-alloys.

VALUE AND PRICE

Reference has already been made to the varying accounting practices of coke operators financially affiliated with iron and steel plants, by which the coke is sometimes charged to the furnace department at cost and sometimes at a price which includes a percentage of profit or at the prevailing market price.

The total value of all coke produced, including the operators' own statement of the value of deliveries to affiliated furnaces, increased from $263,000,000 in 1925 to $308,000,000 in 1926, a gain of 17 per cent. (Table 46.) Pennsylvania, of course, leads all other States in value as in tonnage produced, and almost one-third of the total value in 1926 was contributed by that State alone.

TABLE 46.—*Value of coke produced, by States, 1925 and 1926*

[Exclusive of screenings and breeze]

State	1925	1926	Increase or decrease, 1926
Alabama	$16,801,841	(1)	(1)
Colorado	(1)	(1)	(1)
Georgia	38,464	$23,034	−$15,430
Illinois	22,568,845	25,050,474	+2,481,629
Indiana	36,635,104	44,143,059	+7,507,955
Kentucky	(1)	(1)	(1)
Maryland	(1)	(1)	(1)
Massachusetts	(1)	(1)	(1)
Michigan	11,708,519	12,713,083	+1,004,564
Minnesota	4,992,024	6,014,738	+1,022,714
Missouri	(1)	(1)	(1)
New Jersey	(1)	(1)	(1)
New Mexico	(1)	(1)	(1)
New York	12,968,066	17,455,226	+4,487,160
Ohio	(1)	(1)	(1)
Pennsylvania	76,394,478	96,318,119	+19,923,641
Rhode Island	(1)	(1)	(1)
Tennessee	1,161,100	1,233,499	+72,399
Utah	(1)	(1)	(1)
Virginia	1,901,623	1,716,716	−184,907
Washington	617,265	518,053	−99,212
West Virginia	6,648,745	6,918,103	+269,358
Wisconsin	(1)	(1)	(1)
Combined States	70,123,063	95,669,298	+8,744,394
	262,559,137	307,773,402	+45,214,265

[1] Included under "Combined States."

The average receipts from sales represent the receipts f. o. b. ovens and do not include transportation charges. They vary notably with the distance from the mines. (Table 47.) Thus, the highest average receipts are those reported from Minnesota where the coal must be carried by rail, lake, and rail from the Appalachians, or by even longer all-rail hauls. The average receipts for domestic coke generally range somewhere between the average for furnace coke and the average for foundry coke.

TABLE 47.—*Average receipts per net ton for coke sold, by States, in 1926*

State	By-product					Beehive				
	Furnace		Foundry	Domestic	Industrial, etc.	Furnace		Foundry	Domestic	Industrial, etc.
	To affiliated corporations	Merchant sales				To affiliated corporations	Merchant sales			
Alabama	[1]	$4.53	$5.32	$4.36	[1]			[2]	[2]	[2]
Colorado					[2]	[2]		[2]	[2]	
Georgia								$7.53		
Illinois		7.15	9.11	7.32	$9.55					
Indiana	[1]	[1]	[1]	5.63	7.08					
Kentucky		[2]	[2]	[2]				3.34		$3.56
Maryland				[2]	[2]					
Massachusetts	[1]		[2]	[2]						
Michigan	[1]	[1]	[1]	7.57	[1]					
Minnesota			[1]	[1]	8.92					
Missouri		[2]	[2]	[2]	[2]					
New Jersey			[2]	[2]	[2]					
New Mexico						[2]				[2]
New York	$5.08	6.48	[1]	8.60	[1]					
Ohio	5.11	5.66	7.22	6.47	6.13		[1]			
Pennsylvania	5.19	5.50	[1]	6.71	[1]	$4.65	$3.79	5.24	$6.91	4.73
Rhode Island			[2]	[2]						
Tennessee			6.72	5.07	5.22		4.51	5.84		2.50
Utah		[2]					8.51			
Virginia						3.78	4.07	5.04	7.14	4.63
Washington				8.51						8.68
West Virginia		[1]	[1]	3.35	4.49		3.88	5.37	6.16	4.18
Wisconsin		[2]	[2]	[2]						
Combined States		6.71	8.39	7.35	7.64	7.53		6.09	8.33	5.86
	5.15	6.25	7.77	7.43	7.39	4.77	3.94	5.13	6.94	4.81

[1] Not at liberty to publish. [2] Included under "Combined States."

The course of the average value per ton since 1913 is shown in Table 48. From an average of $3.83 in 1913 the value of by-product coke rose to a maximum of $10.15 in 1920. Since that time the value has decreased, and the average for 1926 was $5.65. The same general trend has been apparent in beehive-coke values.

In connection with Table 48 it should be noted that the value assigned to the part of the output that was produced but not sold has not always been determined in the same way. Before 1918 each operator was asked to place his own value on his entire production, including coke used at the plant but not sold. In 1918 and again in 1920 the value of this part of the product was estimated by assigning to the coke produced but not sold in each State a value per ton equal to the average receipts for the coke sold in the same State. In 1919, again in 1921, and in subsequent years the operator was asked to place his own value on the coke used but not sold. From 1918 to 1920 the figures of total value of all coke produced were therefore not strictly comparable from year to year. Beginning with 1921, however, they are believed to be entirely comparable.

TABLE 48.—*Average value per ton of all coke produced, 1913–1926, and average receipts per ton for coke sold, 1918–1926*

Year	Value per ton produced [1]			Receipts per ton sold		
	By-product	Beehive	Total	By-product	Beehive	Total
1913	$3.83	$2.39	$2.78	[2]	[2]	[2]
1914	3.39	2.15	2.56	[2]	[2]	[2]
1915	3.45	2.07	2.54	[2]	[2]	[2]
1916	3.95	2.69	3.13	[2]	[2]	[2]
1917	6.18	4.81	5.36	[2]	[2]	[2]
1918	7.42	6.21	6.77	$7.88	$6.08	$6.52
1919	6.37	5.15	5.85	6.58	5.05	5.60
1920	10.15	7.94	9.27	10.77	7.43	8.50
1921	5.95	5.45	5.84	7.72	5.41	6.56
1922	6.59	5.84	6.42	8.45	5.79	7.20
1923	6.85	5.98	6.56	8.53	6.06	6.98
1924	5.76	4.70	5.51	6.90	4.63	5.84
1925	5.28	4.56	5.12	6.61	4.52	5.70
1926	5.65	4.57	5.41	6.95	4.57	5.84

[1] Includes operators' statements of the value of coke consumed by them in associated enterprises but not sold, except that in 1918 and 1920 the value of such coke was estimated for each State at the average value for that State of the part of the product reported sold.
[2] Data not available.

Because of these uncertainties attending the statements of value for that part of the product used by the producer but not sold a better index of changes in the market is provided by the average receipts per ton of coke sold. No record is available before 1918, but figures for recent years are shown in the right half of Table 48. The average receipts from sales of by-product coke in 1926 were $6.95 a ton, an increase of 34 cents over the average for the preceding year. The average for beehive coke rose from $4.52 in 1925 to $4.57 in 1926.

Table 49 gives the average value of the coke exported in each year from 1900 to 1926. As these figures include transportation charges from the ovens to the frontier they are affected by changes in freight rates.

TABLE 49.—*Average value per net ton of coke exported from the United States, 1900–1926*

[Computed from records of Bureau of Foreign and Domestic Commerce]

Year	Average value	Year	Average value	Year	Average value
1900	$3.22	1909	$3.22	1918	$7.03
1901	3.63	1910	3.10	1919	7.15
1902	4.06	1911	3.14	1920	10.87
1903	4.49	1912	3.29	1921	9.00
1904	3.94	1913	3.35	1922	8.44
1905	3.34	1914	3.37	1923	9.61
1906	3.21	1915	3.45	1924	7.47
1907	3.27	1916	3.58	1925	7.20
1908	3.11	1917	6.06	1926	7.07

Because the average sales receipts comprise sales on contracts or transfers to affiliated companies, sometimes at nominal prices, they do not reveal the extreme variations in the price of coke on the open market. Table 50 and Figure 19 show the average monthly prices for spot or prompt furnace and foundry coke f. o. b. ovens in the Connellsville district.

Connellsville prices have long been regarded as basic reference prices for the entire industry. The high point reached by the price of furnace coke in 1926 was $7.31 a ton, the average for February when the anthracite suspension, then ending its sixth month, created an abnormal demand for coke. In March prices dropped to an average

of $3.05. From April to September prices on furnace coke ranged between $2.84 and $3, when interest again quickened, this time as an indirect result of the protracted coal strike in Great Britain. A sharp rise in spot prices of coal, followed by temporary advances in the wages of nonunion miners, was reflected in higher prices of coke, although no marked change occurred in the quantity of coke exported. After the settlement of the British strike late in November, the market eased off, and the average price of furnace coke for December was $3.50.

TABLE 50.—*Average monthly prices per net ton at ovens of spot or prompt Connellsville furnace and foundry coke, 1907–1926* [1]

Month	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
FURNACE										
January	$3.53	$1.92	$1.59	$2.55	$1.40	$1.82	$3.88	$1.85	$1.50	$2.94
February	3.50	1.86	1.59	2.12	1.45	1.78	2.52	1.85	1.50	3.38
March	3.02	1.72	1.60	2.00	1.55	2.12	2.40	1.90	1.50	3.47
April	2.72	1.57	1.60	1.77	1.59	2.39	2.15	1.86	1.50	2.41
May	2.16	1.50	1.57	1.66	1.50	2.28	2.13	1.77	1.50	2.30
June	1.89	1.55	1.52	1.65	1.42	2.02	2.11	1.75	1.56	2.49
July	2.40	1.57	1.58	1.59	1.44	2.21	2.45	1.75	1.64	2.75
August	2.62	1.50	1.66	1.57	1.46	2.21	2.50	1.70	1.50	2.80
September	2.82	1.50	2.39	1.60	1.50	2.37	2.29	1.65	1.61	2.94
October	2.85	1.53	2.76	1.59	1.50	3.41	2.98	1.60	2.03	4.88
November	2.41	1.72	2.74	1.50	1.52	3.94	1.82	1.52	2.28	6.90
December	2.06	1.82	2.67	1.44	1.60	4.00	1.75	1.50	2.64	8.38
Average	2.67	1.65	1.94	1.75	1.49	2.55	2.42	1.73	1.73	3.80
FOUNDRY										
January	4.25	2.45	2.00	2.90	1.90	1.97	4.40	2.50	2.00	3.50
February	4.00	2.39	1.95	2.70	2.10	2.09	3.25	2.50	2.00	3.50
March	3.65	2.25	1.95	2.60	2.05	2.56	3.00	2.45	2.00	3.75
April	3.31	2.22	1.86	2.45	2.00	2.69	3.00	2.40	2.00	3.56
May	3.00	2.03	1.85	2.20	1.81	2.58	2.85	2.40	2.00	3.25
June	3.00	2.00	1.80	2.17	1.76	2.40	2.80	2.32	2.00	3.25
July	3.00	2.00	2.00	2.15	1.82	2.40	2.70	2.22	2.05	3.25
August	3.08	1.92	1.95	2.15	1.85	2.40	2.90	2.25	2.00	3.30
September	3.20	1.90	2.55	2.12	1.85	2.54	2.90	2.10	2.07	3.31
October	3.25	2.10	2.90	2.10	1.81	3.65	2.81	2.00	2.35	3.88
November	2.75	2.20	3.25	2.05	1.85	4.25	2.60	1.92	2.88	7.10
December	2.50	2.25	3.20	1.97	1.90	4.50	2.50	1.90	2.95	8.63
Average	3.25	2.14	2.27	2.30	1.89	2.84	2.98	2.25	2.19	4.19

Month	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
FURNACE										
January	$9.50	$6.00	$5.65	$6.00	$5.06	$2.75	$8.05	$3.94	$3.94	$7.19
February	9.62	6.00	4.44	6.00	4.50	3.04	7.13	4.08	3.63	7.31
March	9.60	6.00	4.06	6.00	4.35	3.25	7.25	4.08	3.35	3.05
April	7.38	6.00	3.65	9.60	3.50	4.48	6.31	3.75	3.04	3.00
May	7.80	6.00	3.69	12.00	3.25	6.00	5.15	3.25	3.00	2.91
June	11.25	6.00	4.00	15.00	3.00	6.75	4.75	3.19	2.77	2.83
July	12.75	6.00	4.07	17.20	2.81	10.75	4.55	3.00	2.83	2.84
August	13.60	6.00	4.31	17.75	2.75	12.80	4.56	3.00	3.06	2.95
September	11.12	6.00	4.56	16.70	3.15	11.13	4.50	3.00	3.49	3.38
October	6.00	6.00	4.52	15.12	3.28	9.60	3.85	3.00	6.13	3.63
November	6.00	6.00	5.87	8.26	3.03	7.19	3.81	3.04	5.75	4.43
December	6.00	6.00	6.12	6.20	2.75	7.00	4.00	3.68	4.32	3.50
Average	9.22	6.00	4.58	11.32	3.45	7.06	5.33	3.42	3.78	3.92
FOUNDRY										
January	9.75	7.00	6.25	7.00	6.38	3.75	8.70	4.75	4.88	7.75
February	11.00	7.00	5.00	7.00	5.63	4.00	8.25	4.88	4.31	8.31
March	11.60	7.00	4.94	7.00	5.45	4.25	8.38	4.88	4.15	4.40
April	9.13	7.00	4.30	10.20	4.75	5.06	7.56	4.75	4.00	4.06
May	8.90	7.00	4.31	13.00	4.50	6.30	6.15	4.69	4.00	4.00
June	11.72	7.00	4.56	15.75	4.45	7.25	5.56	4.38	3.80	4.00
July	13.25	7.00	5.00	17.80	4.06	11.00	5.35	4.10	3.75	4.00
August	13.20	7.00	5.25	18.88	3.75	13.90	5.38	4.00	3.88	4.00
September	11.75	7.00	5.80	17.70	4.15	12.50	5.50	4.00	4.25	4.38
October	6.00	7.00	6.25	16.38	4.38	11.70	4.80	4.00	6.31	4.63
November	7.00	7.00	7.00	9.50	4.19	8.38	4.81	4.06	6.81	5.50
December	7.00	7.00	7.00	7.00	3.81	7.88	4.81	4.55	5.20	4.50
Average	10.03	7.00	5.47	12.27	4.63	8.00	6.27	4.42	4.61	4.96

[1] Iron Age, Jan. 6, 1927, p. 120.

EXPORTS AND IMPORTS [1]

Exports of coke from the United States in 1926 were not materially affected by the British miners' strike. The total for the year amounted to 987,260 net tons, a small gain over the preceding year accounted for almost entirely by increased business with Canada. As usual, the principal export movement was to the central Provinces of the Dominion through the Buffalo and Detroit gateways. Outside of Canada the export market for American coke is small. Tables 51 to 54 give the principal facts of the export trade in coke.

Although imports of coke supply an insignificant part of the requirements of the country and are a factor in the home market only in restricted localities a record quantity was received in 1926. The shortage of anthracite caused by the miners' strike stimulated the demand for other house fuels, and foreign coke was imported to help meet the deficit. From 82,833 tons in 1924 the imports increased to 201,579 tons in 1925 and to 284,548 tons in 1926. Detailed figures of coke imports are given in Tables 55 to 57.

TABLE 51.—*Coke exported from the United States, 1909–1926*

Year	Net tons	Value	Year	Net tons	Value
1909	1,002,916	$3,232,673	1918	1,687,824	$11,861,408
1910	984,618	3,053,293	1919	716,956	5,128,119
1911	1,023,727	3,215,990	1920	919,802	9,993,665
1912	912,576	3,002,742	1921	306,755	2,760,939
1913	987,395	3,309,930	1922	511,541	4,319,538
1914	663,585	2,233,686	1923	1,237,342	11,889,897
1915	895,509	3,092,498	1924	659,350	4,926,478
1916	1,174,645	4,202,236	1925	953,812	6,871,962
1917	1,409,320	8,543,746	1926	987,260	6,979,896

TABLE 52.—*Coke exported from the United States, 1924–1926, by customs districts*

District	1924		1925		1926	
	Net tons	Value	Net tons	Value	Net tons	Value
Arizona	5,182	$44,092	836	$7,001	837	$7,862
Buffalo	212,930	1,453,105	413,811	2,998,980	418,251	3,177,383
Dakota	42,731	345,668	41,229	416,826	11,378	91,948
Duluth-Superior	5,798	50,137	11,989	115,869	4,262	38,509
El Paso	188	2,242	204	2,362	39	480
Florida	5,952	56,910	5,836	47,654	12,593	127,606
Georgia	577	11,845				
Los Angeles	7	128	4	66	3	20
Maine and New Hampshire	3,221	24,151	3,380	24,926	3,628	28,415
Maryland	35,842	219,750	17,408	110,216	15,841	109,542
Michigan	180,626	1,205,672	333,384	2,163,113	360,791	2,405,650
Mobile	3,048	32,336	4,204	68,596	6,756	110,388
New Orleans	14,137	195,658	5,611	77,869	1,734	15,470
New York	18,329	257,294	5,757	87,614	5,796	62,829
Ohio	85,407	521,465	68,649	403,390	97,096	425,189
Philadelphia	6,872	99,066	1,090	9,225	2,099	18,094
Porto Rico	76	769	20	354	40	370
Rochester	214	1,774	424	2,531	90	559
Sabine	17,140	132,993	8,518	78,135	3,306	27,500
St. Lawrence	7,994	74,901	18,647	157,147	16,277	138,377
San Antonio	1,346	10,126	1,089	7,632	582	4,240
San Francisco	73	1,825	69	1,427	205	4,136
South Carolina	149	1,201	416	2,986	245	2,013
Vermont	9,458	77,929	10,923	84,839	14,726	114,435
Virginia	898	10,931			9,080	59,967
Washington	1,155	14,310	314	3,204	1,915	11,734
	659,350	4,926,478	953,812	6,871,962	987,260	6,979,896

[1] Figures on exports and imports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

TABLE 53.—*Coke exported from the United States, 1924–1926, by countries of destination*

Destination	1924		1925		1926	
	Net tons	Value	Net tons	Value	Net tons	Value
Africa (British West)					3	$57
Argentina	8	$177			840	9,221
Australia			32	$203		
Austria					560	10,000
Barbados					6	85
Bermuda	1	13				
Brazil	35	441	28	419	1,867	20,457
Canada	549,452	3,828,462	902,688	6,370,289	932,645	6,459,748
Chile	32,454	198,812	17,413	110,531	13,157	83,209
Colombia	91	1,906	199	3,342	221	3,830
Costa Rica	52	923	84	1,560	36	628
Cuba	7,586	70,086	6,906	58,522	13,733	139,717
Dominican Republic	240	3,600	336	4,348	96	1,284
Dutch West Indies					6	65
Ecuador	93	1,813	73	1,551	46	403
France	17,303	257,122	3,282	52,148	4,900	63,406
French Oceania	13	300	1	12		
Germany	9,783	117,704	5,605	63,000	3,200	36,364
Greenland					32	250
Guatemala	91	1,639	115	1,665	85	1,520
Haiti	4	112	25	420	28	420
Honduras	90	1,163	78	1,056	85	1,366
Italy	12,003	108,212	569	10,160	1,414	25,080
Jamaica			4	100		
Mexico	7,750	67,101	3,900	32,502	1,805	16,650
Netherlands	7,805	120,686	4,885	86,793	3,413	38,091
Newfoundland and Labrador	157	1,527	81	1,471		
Nicaragua	44	773	47	743	29	520
Norway	6,981	74,667	6,107	52,206	370	2,554
Other British West Indies	56	531	267	1,825	13	336
Panama	390	5,855	312	3,530	91	1,620
Paraguay	28	504	27	432	28	504
Peru	3,556	22,386			142	2,543
Philippine Islands	25	361			148	2,882
Portugal					259	1,552
Salvador	49	1,126	55	1,036	57	1,222
Spain					30	525
Switzerland	2,373	24,423				
Trinidad and Tobago	1	23	17	156	10	154
United Kingdom	739	12,131	564	10,000	675	12,061
Uruguay					4,860	21,656
Venezuela	94	1,870	111	1,924	2,368	19,889
Virgin Islands of the United States	3	29	1	18	2	27
	659,350	4,926,478	953,812	6,871,962	987,260	6,979,896

TABLE 54.—*Coke exported from the United States, 1924–1926, by months*

Month	1924		1925		1926	
	Net tons	Value	Net tons	Value	Net tons	Value
January	59,491	$499,248	70,386	$526,068	91,687	$746,178
February	60,202	512,358	68,466	535,014	75,821	634,893
March	59,057	458,213	73,898	499,462	97,280	775,138
April	42,769	308,893	59,157	429,449	61,501	435,745
May	45,130	328,619	65,673	435,001	89,895	577,119
June	54,027	391,569	56,542	357,809	85,626	572,049
July	54,861	412,180	71,175	455,069	91,150	553,096
August	47,385	360,316	71,360	482,403	84,320	524,081
September	46,820	317,651	94,030	614,193	72,160	514,944
October	62,450	420,927	79,075	550,223	94,554	577,013
November	64,094	442,140	96,937	797,238	75,199	562,990
December	63,064	474,364	147,113	1,190,033	68,067	506,650
	659,350	4,926,478	953,812	6,871,962	987,260	6,979,896

TABLE 55.—*Coke imported for consumption in the United States, 1909–1926*

Year	Net tons	Value	Year	Net tons	Value
1909	191,253	$736,120	1918	30,168	$221,880
1910	172,716	625,130	1919	16,486	140,653
1911	77,923	254,455	1920	41,143	403,175
1912	123,614	488,398	1921	30,990	336,394
1913	101,212	435,157	1922	94,228	802,987
1914	133,226	551,104	1923	85,002	862,596
1915	53,222	222,382	1924	82,833	795,477
1916	54,955	249,514	1925	201,579	1,609,474
1917	24,872	146,451	1926	284,548	2,174,350

TABLE 56.—*Coke imported into the United States, 1924–1926, by customs districts*

District	1924		1925		1926	
	Net tons	Value	Net tons	Value	Net tons	Value
Buffalo	14,241	$286,660	22,429	$462,772	21,754	$472,228
Connecticut					4,814	22,145
Dakota			20	122		
Hawaii			581	3,542		
Los Angeles	21,311	141,888	22,478	135,521	17,356	105,830
Maine and New Hampshire	299	2,139	5,605	28,147	19,615	118,578
Massachusetts			25,679	169,334	43,712	262,409
Michigan	343	7,341	27	201	10,316	73,831
Montana and Idaho	8,699	90,227	24,900	209,123	27,892	223,506
New York			43,166	260,681	62,844	494,391
Ohio			1	7		
Oregon	1,342	11,611	3,228	17,075	4,085	22,574
Rhode Island			3,530	14,573	16,659	99,922
St. Lawrence			2,759	31,316	360	3,593
San Antonio					32	323
San Francisco	31,426	221,519	38,070	225,488	45,815	224,331
Vermont	86	621	460	2,942	502	4,208
Washington	5,086	33,471	8,646	48,630	8,792	46,481
	82,833	795,477	201,579	1,609,474	284,548	2,174,350

TABLE 57.—*Coke imported into the United States, 1924–1926, by countries*

Country	1924		1925		1926	
	Net tons	Value	Net tons	Value	Net tons	Value
Belgium			4,397	$20,844	8,501	$35,593
Canada	25,084	$397,868	52,182	716,251	62,177	785,173
Germany	5,638	30,264	15,447	95,180	60,104	313,603
Ireland	1,923	12,412				
Mexico					32	323
Netherlands	4,756	34,879	17,197	134,022	58,243	479,343
Sweden			112	1,577		
United Kingdom:						
England	43,933	313,906	112,244	641,600	95,491	558,315
Scotland	899	6,148				
	82,833	795,477	201,579	1,609,474	284,548	2,174,350

SHIPMENTS BY RAIL AND WATER

The following tables (Nos. 58–61), showing the quantity of by-product and beehive coke shipped by originating railroads and waterways, are compiled from reports of the coke operators and therefore may not always agree with the records of the carriers themselves. In the by-product industry a large part of the coke produced is consumed in close proximity to the ovens and is not loaded for shipment. In 1926 shipments of by-product coke

amounted to only 42.7 per cent of production. (Table 58.) The beehive ovens, on the other hand, are usually situated at the mines, and the great bulk of the beehive coke produced must be transported some distance to reach the place of use. Table 60 shows that in 1926, for the country as a whole, 93.7 per cent of the beehive coke produced was loaded for shipment.

In some localities, however, the furnaces that consume beehive coke are also located at the mines, and considerable quantities of the coke produced are used locally without appearing as railroad shipments. This fact is notably true of the Birmingham district.

Water-borne shipments of beehive coke are practically confined to the Monongahela River, down which a comparatively small tonnage is transported to the Pittsburgh district out of the Connellsville field. By-product coke moves in small quantities over several water routes, the most important of which are Chesapeake Bay and the Hackensack, Hudson, and Monongahela Rivers.

TABLE 58.—*By-product coke loaded for shipment on originating railroads and waterways in the United States in 1926, by States, as reported by the coke producers*

State	Originating railroad or waterway	Shipments (net tons)	Per cent of State production shipped
	RAILROADS		
Alabama	Birmingham Southern; Illinois Central; Louisville & Nashville; Mobile & Ohio; St. Louis-San Francisco; Seaboard Air Line; Southern.	1,365,973	28.6
Colorado	Colorado & Wyoming	18,985	3.2
Illinois	Belt Railway of Chicago; Chicago & Alton; Chicago & Illinois Western; Chicago & North Western; Chicago Short Line; Elgin, Joliet & Eastern; Illinois Central.	2,256,059	67.6
Indiana	Chicago, Milwaukee & St. Paul; Cleveland, Cincinnati, Chicago & St. Louis; Elgin, Joliet & Eastern; New York Central; Pennsylvania; Wabash.	2,135,869	35.7
Maryland	Pennsylvania	52,106	4.6
Massachusetts	Boston & Albany; Boston & Maine	484,052	84.4
Michigan	Detroit, Toledo & Ironton; Michigan Central; New York Central; Pennsylvania; Pere Marquette.	1,035,381	56.7
Minnesota	Duluth, Missabe & Northern; Great Northern; Northern Pacific.	354,960	57.3
New Jersey	Delaware, Lackawanna & Western; Erie; Pennsylvania; Philadelphia & Reading.	157,738	17.3
New York	Delaware, Lackawanna & Western; Lehigh Valley; New York Central; South Buffalo.	996,275	35.2
Ohio	Baltimore & Ohio; Erie; Fairport, Painesville & Eastern; Lake Terminal; Newburgh & South Shore; New York Central; Norfolk & Western; Pennsylvania; Pittsburgh & Lake Erie; Toledo Terminal.	1,384,625	18.3
Pennsylvania	Conemaugh & Black Lick; Lehigh Valley; Pennsylvania; Philadelphia & Reading; Union; Upper Merion & Plymouth.	5,512,037	49.2
Tennessee	Central of Georgia; Nashville, Chattanooga & St. Louis; Southern.	114,473	96.5
Utah	Denver & Rio Grande Western; Union Pacific	63,936	34.6
Washington	Northern Pacific	3,855	9.1
West Virginia	Baltimore & Ohio; Pennsylvania; Wheeling & Lake Erie	498,930	44.2
Kentucky, Missouri, Rhode Island, and Wisconsin.	Chesapeake & Ohio; Chicago & Northwestern; Chicago, Minneapolis & St. Paul; Minneapolis, St. Paul & Sault Ste. Marie; Missouri Pacific; New York, New Haven & Hartford.	1,404,399	89.4
	Total railroad shipments	17,839,653	
	WATERWAYS		
Maryland	Chesapeake Bay	121,135	10.8
New Jersey	Hackensack River	561,289	61.5
New York and Pennsylvania.	Hudson River and Monongahela River	387,856	2.8
Massachusetts and Rhode Island.	Mystic River; Long Island Sound; Narragansett Bay	23,540	3.3
	Total waterway shipments	1,093,820	
	Grand total	18,933,473	42.7

TABLE 59.—*Alphabetical list of railroads and waterways on which by-product coke was loaded for shipment in 1926, as reported by the coke producers*

Railroad or waterway	States in which coke was loaded for shipment
RAILROADS	
Baltimore & Ohio	Ohio and West Virginia.
Belt Railway of Chicago	Illinois.
Birmingham Southern	Alabama.
Boston & Albany	Massachusetts.
Boston & Maine	Do.
Central of Georgia	Tennessee.
Chesapeake & Ohio	Kentucky.
Chicago & Alton	Illinois.
Chicago & Illinois Western	Do.
Chicago & Northwestern	Illinois and Wisconsin.
Chicago, Milwaukee & St. Paul.	Indiana and Wisconsin.
Chicago Short Line	Illinois.
Cleveland, Cincinnati, Chicago & St. Louis.	Indiana.
Colorado & Wyoming	Colorado.
Conemaugh & Black Lick	Pennsylvania.
Delaware, Lackawanna & Western.	New Jersey and New York.
Denver & Rio Grande Western.	Utah.
Detroit, Toledo & Ironton	Michigan.
Duluth, Missabe & Northern	Minnesota.
Elgin, Joliet & Eastern	Illinois and Indiana.
Erie	New Jersey and Ohio.
Fairport, Painesville & Eastern.	Ohio.
Great Northern	Minnesota.
Illinois Central	Alabama and Illinois.
Lake Terminal	Ohio.
Lehigh Valley	New York and Pennsylvania.
Louisville & Nashville	Alabama.
Michigan Central	Michigan.
Minneapolis, St. Paul & Sault Ste. Marie.	Wisconsin.
Missouri Pacific	Missouri.
RAILROADS—continued	
Mobile & Ohio	Alabama.
Nashville, Chattanooga & St. Louis.	Tennessee.
Newburgh & South Shore	Ohio.
New York Central	Indiana, Michigan, New York, and Ohio.
New York, New Haven & Hartford.	Rhode Island.
Norfolk & Western	Ohio.
Northern Pacific	Minnesota and Washington.
Pennsylvania	Indiana, Maryland, Michigan, New Jersey, Ohio, Pennsylvania, and West Virginia.
Pere Marquette	Michigan.
Philadelphia & Reading	New Jersey and Pennsylvania.
Pittsburgh & Lake Erie	Ohio.
St. Louis-San Francisco	Alabama.
Seaboard Air Line	Do.
South Buffalo	New York.
Southern	Alabama and Tennessee.
Toledo Terminal	Ohio.
Union	Pennsylvania.
Union Pacific	Utah.
Upper Merion & Plymouth	Pennsylvania.
Wabash	Indiana.
Wheeling & Lake Erie	West Virginia.
WATERWAYS	
Chesapeake Bay	Maryland.
Hackensack River	New Jersey.
Hudson River	New York.
Long Island Sound	Rhode Island.
Monongahela River	Pennsylvania.
Mystic River	Massachusetts.
Narragansett Bay	Rhode Island.

TABLE 60.—*Beehive coke loaded for shipment on originating railroads and waterways in the United States in 1926, by States, as reported by the coke producers*

State	Railroad	Shipments (net tons)	Production (net tons)	Per cent of production shipped
Colorado	Colorado & Wyoming	72,723		
	Denver & Rio Grande Western	111,716		
		184,439	197,179	93.5
Georgia	Central of Georgia	2,988	3,059	96.9
Kentucky	Chesapeake & Ohio	82,850		
	Louisville & Nashville	64,240		
		147,090	147,540	99.7
Ohio			84,970	
Pennsylvania	Baltimore & Ohio	1,548,828		
	Buffalo & Susquehanna	201,300		
	Buffalo, Rochester & Pittsburgh	150,410		
	Huntington & Broad Top Mountain	599		
	Ligonier Valley	133,874		
	Monongahela	2,954,089		
	Pennsylvania	4,574,963		
	Pittsburgh & Lake Erie	101,130		
	Pennsylvania; Pittsburgh & Lake Erie	2,051		
	Washington Run	114,207		
		9,781,451	10,722,372	91.2

TABLE 60.—*Beehive coke loaded for shipment on originating railroads and waterways in the United States in 1926, by States, as reported by the coke producers*—Con.

State	Railroad	Shipments (net tons)	Production (net tons)	Per cent of production shipped
Tennessee	Nashville, Chattanooga & St. Louis	23,806		
	Southern	16,000		
		39,806	122,410	32.5
Utah	Denver & Rio Grande Western	121,475	121,475	100.0
Virginia	Chesapeake & Ohio	4,267		
	Interstate	311,203		
	Louisville & Nashville	14,157		
	Norfolk & Western	36,308		
		365,935	370,983	98.6
Washington	Northern Pacific	24,702	24,702	100.0
West Virginia	Baltimore & Ohio	154,645		
	Chesapeake & Ohio	128,987		
	New York Central	108,363		
	Norfolk & Western	180,185		
	Western Maryland	8,322		
		580,502	583,599	99.5
Alabama and New Mexico.	Louisville & Nashville; Southern Pacific	99,277	110,682	89.7
	Total railroad shipments	11,347,615		
	Total waterway shipments (Monongahela River, Pa.).	349,973	(1)	3.3
	Grand total	11,697,588	12,488,951	93.7

[1] Figures given under Pennsylvania above.

TABLE 61.—*Beehive coke loaded for shipment on originating railroads and waterways in the United States in 1926, by routes, as reported by the coke producers*

Route	State	Quantity (net tons)		Per cent of total
		By States	Total	
Railroads:				
Baltimore & Ohio	Pennsylvania	1,548,828	1,703,473	14.6
	West Virginia	154,645		
Buffalo & Susquehanna	Pennsylvania	201,300	201,300	1.7
Buffalo, Rochester & Pittsburgh	do	150,410	150,410	1.3
Central of Georgia	Georgia	2,938	2,938	(1)
Chesapeake & Ohio	Kentucky	82,850		
	Virginia	4,267	216,104	1.8
	West Virginia	128,987		
Colorado & Wyoming	Colorado	72,723	72,723	.6
Denver & Rio Grande Western; Southern Pacific.	Colorado and New Mexico.	171,808	293,283	2.5
	Utah	121,475		
Huntingdon & Broad Top Mountain	Pennsylvania	599	599	(1)
Interstate	Virginia	311,203	311,203	2.7
Ligonier Valley	Pennsylvania	133,874	133,874	1.1
Louisville & Nashville	Alabama and Kentucky	103,425	117,582	1.0
	Virginia	14,157		
Monongahela	Pennsylvania	2,954,089	2,954,089	25.3
Nashville, Chattanooga & St. Louis	Tennessee	23,806	23,806	.2
New York Central	West Virginia	108,363	108,363	.9
Norfolk & Western	Virginia	36,308	216,493	1.9
	West Virginia	180,185		
Northern Pacific	Washington	24,702	24,702	.2
Pennsylvania	Pennsylvania	4,574,963	4,574,963	39.1
Pittsburgh & Lake Erie	do	101,130	101,130	.9
Pennsylvania; Pittsburgh & Lake Erie	do	2,051	2,051	(1)
Southern	Tennessee	16,000	16,000	.1
Washington Run	Pennsylvania	114,207	114,207	1.0
Western Maryland	West Virginia	8,322	8,322	.1
Total railroad shipments		11,347,615	11,347,615	97.0
Waterways: Monongahela River	Pennsylvania	349,973	349,973	3.0
Grand total		11,697,588	11,697,588	100.0

[1] Less than 0.1 per cent.

WORLD PRODUCTION

The world production of metallurgical coke in 1926 was approximately 107,000,000 metric tons, practically the same as in 1925. (Table 62.) The increase in the United States was offset by a sharp decrease in Great Britain, where the shortage of coal created by the miners' strike caused the production to fall from 11,185,000 tons in 1925 to 4,790,000 tons in 1926. Production decreased slightly in Germany, also, but increased in Belgium, Poland, and Russia.

TABLE 62.—*Coke produced in the principal countries of the world, 1922–1926, in metric tons* [1]

[Compiled by L. M. Jones, of the Bureau of Mines]

Country	1922	1923	1924	1925	1926
Australia:					
New South Wales	244,085	589,689	573,420	619,199	607,255
Queensland	5,388	5,330	7,230	5,470	6,290
Belgium	2,849,884	4,179,964	4,216,580	4,111,771	4,916,683
Canada	605,814	1,037,985	833,691	959,438	1,329,314
China (exports)	45,097	29,795	27,606	[2] 19,217	14,551
Czechoslovakia	882,365	1,809,598	2,220,556	2,015,968	1,961,762
France	2,362,280	4,287,109	5,367,415	6,024,700	[3]
Germany [4]	31,022,480	14,203,569	25,100,888	28,669,631	27,552,668
Great Britain [5]	9,180,765	13,633,678	12,958,049	11,185,375	4,790,420
India, British [6]	327,676	307,764	371,944	478,753	[3]
Italy	167,953	275,235	309,971	512,264	591,528
Japan:					
Japan proper	720,554	658,053	832,429	849,202	1,035,409
Taiwan	[3]	[3]	[3]	13,409	[7] 15,602
Netherlands	451,758	671,687	975,779	1,143,806	1,198,069
Peru		45,000	20,000	[3]	25,000
Poland	[8] 678,972	1,376,194	949,758	963,964	1,114,571
Rhodesia, Southern	97,670	122,897	137,078	138,339	155,069
Russia	[9] 112,333	[3]	[10] 723,800	[10] 1,350,300	[10] 2,773,715
Spain	311,423	651,966	724,082	861,130	693,739
Sweden	27,195	114,200	79,328	77,369	112,542
Union of South Africa	38,405	53,926	67,561	67,829	80,312
United States	33,678,161	51,688,879	40,160,500	46,508,345	51,587,278
	83,820,000	95,956,000	96,671,000	106,595,000	107,000,000

[1] Gas-house coke is not included.
[2] Production in 1925 is estimated at 695,535 tons (Hsieh, C. Y., General statement on the mining industry. China, Geol. Surv. Spec. Rept. No. 2, Peking, 1926). Similar figures for other years are not available.
[3] Estimate included in total.
[4] Includes all of Upper Silesia, January–May, 1922; German Upper Silesia, June–December, 1922, and subsequent years; and the Saar all five years.
[5] In Great Britain the production of gas-house coke (including breeze), not included above, is especially important and was as follows: 1922, 11,037,012 tons; 1923, 11,692,948 tons; 1924, 12,279,666 tons; 1925, 12,022,759 tons; 1926, 11,784,401 tons.
[6] Figures represent only coke made at collieries.
[7] Includes a small quantity of gas-house coke.
[8] Includes output for June–December of that part of Upper Silesia allocated to Poland.
[9] Output of the Donetz Basin.
[10] Year ended Sept. 30.

COKE-OVEN BY-PRODUCTS

SUMMARY TABLES

The output of by-products in 1926 reflects the record production of by-product coke. The total receipts from the sale of by-products (excluding breeze and screenings) amounted to $134,469,769 in 1926, an increase of nearly 10 per cent when compared with the previous high mark established in 1925. This represents 34.1 per cent of the total value of all products of the by-product coke industry; and if breeze is counted as a by-product, the value of by-products in 1926 becomes 36.4 per cent of the total.

Table 63 summarizes the by-products of coke-oven operation in 1926.

TABLE 63.—*By-products obtained from coke-oven operations in the United States, 1925 and 1926*

Product	Production	Sales		
		Quantity	Value	
			Total	Average
1925				
Tar.....gallons	480,848,814	240,160,986	$11,903,196	$0.049
Ammonia:				
Sulphate.....pounds	1,017,014,550	989,676,520	22,546,908	.023
Ammonia liquor (NH_3 content).....do	65,255,767	54,809,335	4,966,885	.091
			27,513,793	
Sulphate equivalent of all forms.....do	1,278,037,618	1,208,913,860		
Gas:				
Used under boilers, etc.....M cubic feet	[1] 639,644,062	25,239,072	1,451,253	.058
Used in steel or affiliated plants.....do		230,030,325	26,380,657	.115
Distributed through city mains.....do		77,457,262	29,319,309	.379
Sold for industrial use.....do		29,527,613	4,333,000	.147
		362,254,272	61,484,219	.170
Light oil and derivatives:				
Crude light oil.....gallons	[2] 146,443,106	10,201,900	1,052,585	.103
Benzol, crude.....do	6,119,160	5,907,106	1,321,597	.224
Benzol, refined.....do	16,231,714	15,909,280	3,566,643	.224
Motor benzol.....do	81,469,925	80,957,983	13,441,422	.166
Toluol, crude.....do	127,584	46,789	10,052	.215
Toluol, refined.....do	5,329,560	4,991,358	1,300,734	.261
Solvent naphtha.....do	4,744,431	3,993,735	805,251	.202
Other light-oil products.....do	2,366,246	1,252,451	96,073	.077
	[3] 116,388,620	123,260,602	21,594,357	.175
Naphthalene:				
Crude.....pounds	9,238,890	9,692,185	92,369	.010
Refined.....do	1,018	208,332	5,124	.025
	9,239,908	9,900,517	97,493	.010
Other products			132,466	
Value of all by-products sold			122,725,524	
1926				
Tar.....gallons	529,486,374	277,248,522	14,103,760	.051
Ammonia:				
Sulphate.....pounds	1,167,859,453	1,152,141,717	24,658,031	.021
Ammonia liquor (NH_3 content).....do	53,523,229	53,448,034	3,470,172	.065
			28,128,203	
Sulphate equivalent of all forms.....do	1,381,952,369	1,365,933,853		
Gas:				
Used under boilers, etc.....M cubic feet	[1] 706,681,828	25,953,876	1,438,699	.055
Used in steel or affiliated plants.....do		249,840,649	27,955,574	.112
Distributed through city mains.....do		89,565,953	29,978,997	.335
Sold for industrial use.....do		32,553,610	5,313,530	.163
		397,914,088	64,686,800	.163
Light oil and derivatives:				
Crude light oil.....gallons	[2] 164,059,552	10,783,568	1,330,208	.123
Benzol, crude.....do	4,744,713	4,660,621	1,109,974	.238
Benzol, refined.....do	17,713,904	17,327,169	3,957,719	.228
Motor benzol.....do	90,029,972	89,501,212	16,863,109	.188
Toluol, crude.....do	432,317	400,308	127,298	.318
Toluol, refined.....do	8,359,135	8,250,297	2,787,454	.338
Solvent naphtha.....do	4,704,555	3,546,117	1,035,870	.292
Other light-oil products.....do	4,127,710	1,324,303	93,344	.070
	[3] 130,112,306	135,793,595	27,304,976	.201
Naphthalene:				
Crude.....pounds	7,746,821	7,556,372	96,210	.013
Refined.....do	139,701	166,851	1,100	[4]
	7,886,522	7,723,223	97,310	.013
Other products			148,720	
Value of all by-products sold			134,469,769	

[1] Includes gas wasted and gas used for heating retorts.
[2] Refined on the premises to make the derived products shown: 1925, 143,296,567 gallons of crude oil; 1926, 159,589,756 gallons.
[3] Total gallons of derived products.
[4] Quantity sold too small to be representative.

The average receipts from the sale of each by-product per ton of coke produced are shown in Table 64 and Figure 23. Gas is now the most valuable of the by-products and in 1926 brought an average return of $1.46 per ton of coke. Ammonia remains second in value among the by-products, furnishing a credit of $0.63 per ton of coke in 1926. Since 1920, however, the value of the ammonia recovered has been decreasing because of a decline in price. Prices of the group of benzol products, on the other hand, were increasing in 1925 and 1926, and the average value of the benzols per ton of coke rose from $0.50

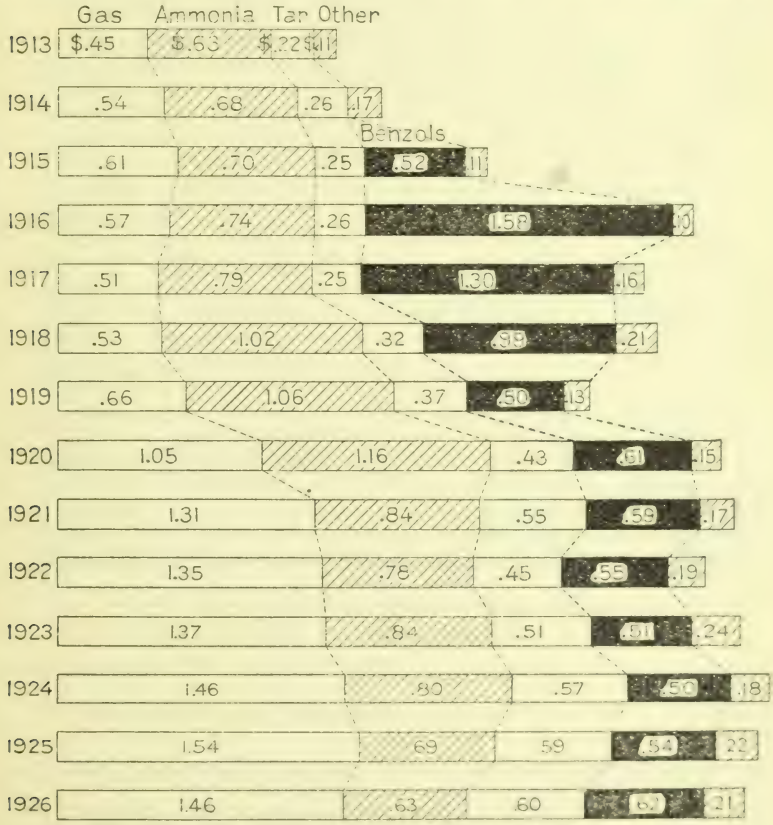

FIGURE 23.—Value of the several by-products per ton of coke produced, 1913-1926

in 1924 to $0.62 in 1926. As a result of these changes, the credits from the benzol group came within 1 cent of those from ammonia.

The value of the tar recovered in 1926, including tar used by the producer as well as that sold, amounted to $0.60 per ton of coke produced. The value of the breeze recovered averaged $0.21 per ton of coke. Including breeze the total of all by-products per ton of coke was $3.52. (Fig. 23.) It must be remembered, however, that these values do not represent a net profit or a net deduction from the cost of making coke but are the gross receipts from sales of the several by-products, from which must be deducted the cost of recovery before the net contribution from by-products is known.

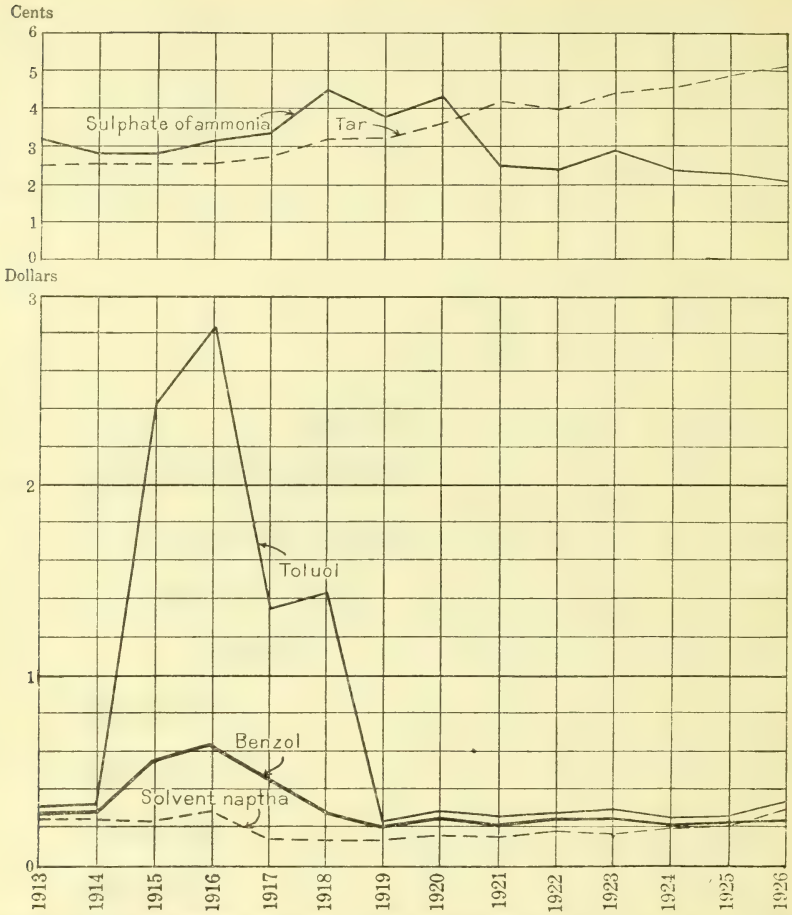

FIGURE 24.—Average receipts per unit of principal refined light oils and other by-products, 1913–1926

Table 65 shows the trend of prices of each of the principal by-products. (See also fig. 24.)

TABLE 64.—*Value of by-products and of coke, including breeze, per ton of coke produced in the United States, 1917–1926*

Product	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Ammonia and its compounds	$0.79	$1.02	$1.06	$1.16	$0.84	$0.78	$0.84	$0.80	$0.69	$0.63
Light oil and its derivatives (including naphthalene)	1.30	.99	.50	.61	.59	.55	.51	.50	.54	.62
Surplus gas sold or used	.51	.53	.66	1.05	1.31	1.35	1.37	1.46	1.54	1.46
Tar	.25	.24	.28	.21	.29	.22	.25	.28	.30	.32
Miscellaneous products	.06	.09	.03	.01	.01	.01	.01			
	2.91	2.87	2.53	3.04	3.04	2.91	2.98	3.04	3.07	3.03
Tar used	(1)	.08	.09	.22	.26	.23	.26	.29	.29	.28
Breeze produced	.10	.12	.10	.14	.16	.18	.24	.18	.22	.21
Total value of by-products, including those not sold	3.01	3.07	2.72	3.40	3.46	3.32	3.48	3.51	3.58	3.52
Value of coke produced	6.18	[2] 7.42	[2] 6.37	[2] 10.15	[2] 5.95	[2] 6.59	[2] 6.85	[2] 5.76	[2] 5.28	[2] 5.65
Total value of coke and by-products	9.19	10.49	9.09	13.55	9.41	9.91	10.33	9.27	8.86	9.17

[1] Included in tar sold.

[2] The average receipts per ton of coke sold during these years were $7.88 in 1918, $6.58 in 1919, $10.77 in 1920, $7.72 in 1921, $8.45 in 1922, $8.53 in 1923, $6.90 in 1924, $6.61 in 1925, and $6.95 in 1926.

TABLE 65.—*Average receipts per unit of coke-oven by-products sold, 1913–1926*

[The figures in this table for 1913 to 1917 represent "average value of by-products produced and sold." For 1918 to 1926 they represent "average receipts from sales." The two sets of figures are probably comparable for practical purposes]

	Tar	Sulphate	Surplus gas	Benzol, refined	Motor benzol	Toluol, refined	Solvent naphtha	Naphthalene	
								Crude	Refined
Unit	Gallon	Pound	M cubic feet	Gallon	Gallon	Gallon	Gallon	Pound	Pound
	Cents	*Cents*	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	
1913	2.5	3.1	8.8	[1] 27	[2]	[1] $0.29	[1] 25	[2]	
1914	2.6	2.8	9.8	[1] 26	[2]	[1] .33	[1] 25	[2]	
1915	2.6	2.8	10.2	56.8	[3]	2.45	24	[4] 10.0	
1916	2.6	3.1	9.8	62.4	[3]	2.85	28.4	[4] 3.4	
1917	2.7	3.4	8.7	45.0	[3]	1.37	16.6	[4] 3.3	
1918	3.2	4.5	8.7	27.5	[3]	1.43	14.1	2.8	6.6
1919	3.2	3.8	8.6	20.6	[5]	.263	15.2	2.0	4.1
1920	3.7	4.3	14.0	26.0	22.7	.300	18.1	2.7	6.1
1921	4.2	2.5	16.8	23.9	17.9	.283	17.7	2.5	5.6
1922	4.0	2.5	16.7	28.5	19.1	.292	18.8	1.6	5.0
1923	4.4	2.9	16.2	24.8	16.3	.291	17.9	1.7	5.5
1924	4.6	2.4	16.5	20.9	15.2	.241	18.7	1.5	3.6
1925	4.9	2.3	17.0	22.4	16.6	.261	20.2	1.0	2.5
1926	5.1	2.1	16.3	22.8	18.8	.338	29.2	1.3	[5]

[1] Trade quotations, New York market; used to avoid disclosing individual operators' reports.
[2] No data.
[3] Not reported during the war.
[4] Crude and refined, not separated prior to 1918.
[5] Data uncertain.

The trend of the average recovery of the principal by-products per ton of coal charged is the subject of Table 66 and Figure 25. From 1915 to 1921 the average yields of tar, light oil, and ammonia increased notably, but since 1921 they have shown no consistent change. The quantity of surplus gas per ton carbonized has continued to increase, a fact which helps to explain the increasing credits from gas per ton of coke shown by Figure 23.

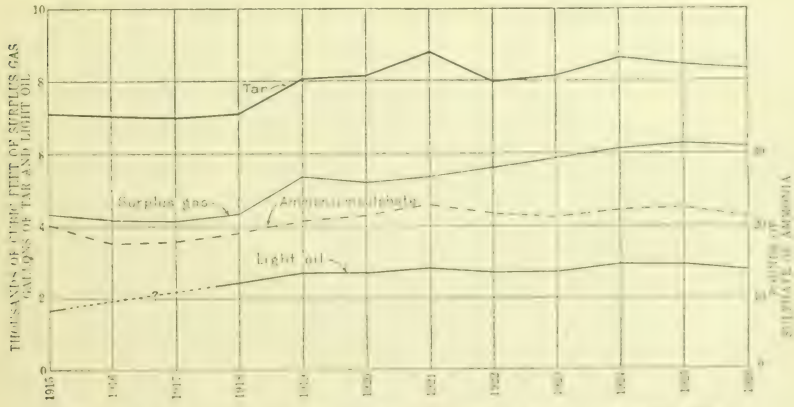

FIGURE 25.—Average yield of by-products per net ton of coal charged, 1915-1926

TABLE 66.—*Average yield of coke and by-products per net ton of coal charged in by-product ovens in the United States, 1918–1926*

Product	1918	1919	1920	1921	1922	1923	1924	1925	1926
Coke.....pounds..	1,410	1,402	1,395	1,376	1,390	1,386	1,386	1,398	1,394
Tar.....gallons..	7.1	8.1	8.2	8.8	8.0	8.1	8.6	8.4	8.3
Ammonium sulphate (or equivalent) .....pounds..	18.9	20.8	21.4	22.8	21.9	21.2	22.2	22.4	21.7
Light oil.....gallons..	2.4	2.7	[1] 2.7	[1] 2.8	[1] 2.7	[1] 2.7	[1] 2.9	[1] 2.9	[1] 2.8
Gas:									
Total.....M cubic feet..	10.4	11.6	10.8	10.8	10.8	11.1	11.0	11.2	11.1
Surplus sold or used.....do....	4.3	5.4	5.2	5.4	5.6	5.9	6.1	6.3	6.2
Burned in coking process....do....	5.7	5.9	5.4	5.1	5.0	5.0	4.7	4.7	4.7
Wasted.....do....	.4	.3	.2	.3	.2	.2	.2	.2	.2

[1] Average for plants recovering light oil.

TAR

The output of coke-oven tar in 1926 amounted to 529,486,374 gallons, a 10 per cent increase over 1925. Of this amount 277,248,522 gallons was sold, the remainder being used by the producer. The average value of all tar sold in 1926 was 5.1 cents a gallon, a gain of 0.2 cent when compared with 1925.

The average yield of tar per ton of coal carbonized in 1926 was 8.3 gallons, somewhat less than the average yield in 1925, 1924, and 1921, but more than in other recent years. (Table 66 and fig. 25.) The yield varies greatly from plant to plant, depending upon the kind of coal, temperature of oven operation, completeness of tar recovery, and other factors. In modern plants using the average grades of coal that are selected for by-product coke manufacture the tar yield is between 9 and 10 gallons per ton of coal carbonized. There are, of course, a few plants where considerably higher yields are obtained, and in the older ovens that are operated at higher temperature in the upper section of the oven the yield is commonly not as great.

TABLE 67.—*Coke-oven tar produced and sold in the United States in 1926, by States*

State	Produced (gallons)		Sold			Used (gallons)			On hand Dec. 31 (gallons)
	Total	Per ton of coal coked	Gallons	Value		As fuel under boilers	In open-hearth or affiliated plants	Otherwise	
				Total	Average				
Alabama	59,255,154	8.7	36,096,952	$1,743,453	$0.048	(1)	(1)	(1)	2,343,941
Colorado	9,202,000	10.7					9,059,570	21,164	152,012
Illinois	36,305,229	7.7	33,308,087	1,690,376	.051		(1)	50	1,727,205
Indiana	45,998,449	5.8	17,332,529	892,048	.051		28,641,336		2,992,307
Maryland	9,930,808	6.5	10,264,161	(1)	(1)		32,144		1,140,721
Massachusetts	7,806,614	8.9	7,982,357	(1)	(1)				1,463,737
Michigan	18,370,259	7.3	9,484,433	519,182	.055	(1)	(1)	(1)	1,065,001
Minnesota	6,603,806	7.3	(1)	(1)	(1)		(1)		491,342
New Jersey	10,061,490	8.0	10,064,457	(1)	(1)				138,220
New York	34,636,434	8.8	24,536,403	1,327,670	.054		(1)	(1)	2,058,412
Ohio	93,959,388	8.6	49,438,989	2,655,291	.054	(1)	45,700,085	(1)	2,909,869
Pennsylvania	159,618,134	9.4	37,874,279	1,586,980	.042	1,780,308	119,585,275	(1)	5,424,885
Tennessee	1,235,267	7.5	1,222,375	53,200	.044				137,002
Utah	3,737,700	11.4	3,688,347	(1)	(1)				49,353
Washington	533,472	7.9	(1)	(1)	(1)			1,301	40,510
West Virginia	16,564,189	10.1	13,017,412	702,933	.054		4,129,679		310,833
Kentucky, Missouri, Rhode Island and Wisconsin	15,667,981	7.2	17,159,672	864,144	.050				722,941
Undistributed			5,778,069	2,068,483	.055	6,223,157	43,686,206	4,640,399	
	529,486,374	8.3	277,248,522	14,103,760	.051	8,003,465	250,834,295	4,662,914	23,168,291

[1] Included under "Undistributed."

The operators of merchant or nonfurnace plants generally sell all their tar. At the plants connected with iron furnaces the bulk of the tar produced may be advantageously used either as boiler fuel or in open-hearth or other metallurgical heating operations. Table 68 shows the quantities used and sold by the two classes of operators. Table 69 gives the percentage of the total supply of coke-oven tar sold and used by producers in each year from 1918 to 1926.

TABLE 68.—*Disposal of coke-oven tar produced in the United States, 1925–26, in gallons*

	1925			1926		
	Furnace plants	Other plants	Total	Furnace plants	Other plants	Total
Sold	[1] 150, 863, 101	[1] 89, 297, 885	240, 160, 986	175, 380, 938	101, 867, 584	277, 248, 522
Used:						
As fuel under boilers	4, 974, 364	----------	4, 974, 364	8, 003, 465	----------	8, 003, 465
In open-hearth or other metallurgical plants	228, 319, 084	----------	228, 319, 084	250, 834, 295	----------	250, 834, 295

[1] Figures revised because of changes in definitions of "Furnace" and "Other" plants.

TABLE 69.—*Per cent of coke-oven tar sold and per cent used by the producer, 1918–1926* [1]

Year	Sold	Used by producer	Year	Sold	Used by producer
	Per cent	*Per cent*		*Per cent*	*Per cent*
1918	76.0	24.0	1923	48.0	52.0
1919	75.4	24.6	1924	49.7	50.3
1920	48.3	51.7	1925	49.9	50.1
1921	53.5	46.5	1926	52.4	47.6
1922	49.5	50.5			

[1] The percentages are based on the total production, no account being taken of changes in stock.

In addition to the tar derived from coke ovens, about 50,000,000 gallons of coal tar is recovered in gas works. The total production of coal tar from both sources in 1926 was in round numbers 583,000,000 gallons (Table 70); about 326,000,000 gallons were sold, the remainder being used by the producer. Most of the quantity sold went to tar refiners, who reported distilling 248,000,000 gallons in 1926. (U. S. Tariff Commission, Census of Dyes and Other Synthetic Organic Chemicals, 1926, p. 14.) Table 70 also gives the available statistics of water-gas and oil-gas tar, but it must be remembered that these substances, which result from the cracking of petroleum oils, differ materially from coal tar in composition, yield few and less valuable derivatives, and, though sometimes purchased by tar refiners, are chiefly valuable as liquid fuel.

TABLE 70.—*Production and sales of coke-oven, coal-gas, water-gas, and oil-gas tar in the United States, 1918–1926*

	Coke-oven tar [1]	Coal-gas tar [2]	Total coal tar [3]	Water and oil gas tar
Production (gallons):				
1918	263, 299, 470	52, 694, 826	315, 994, 296	100, 985, 156
1919	288, 901, 739	53, 146, 421	342, 048, 160	[4] 105, 318, 339
1920	360, 664, 124	51, 264, 956	411, 929, 080	116, 073, 907
1921	253, 051, 649	[5]	309, 051, 649	[6]
1922	327, 779, 734	48, 082, 228	375, 861, 962	104, 555, 028
1923	440, 907, 109	[5]	493, 407, 109	[6]
1924	422, 074, 326	[7]	475, 074, 326	[6]
1925	480, 848, 814	[5]	534, 848, 814	[6]
1926	529, 486, 374	[7]	583, 486, 374	[6]
Sales (gallons):				
1918	200, 233, 002	47, 727, 839	247, 960, 841	55, 283, 484
1919	217, 707, 157	49, 307, 852	267, 015, 009	[4] 58, 557, 947
1920	174, 363, 696	46, 604, 133	220, 967, 829	59, 238, 730
1921	135, 293, 047	51, 976, 307	187, 269, 354	[4] 53, 432, 945
1922	162, 204, 417	41, 266, 074	203, 470, 491	47, 338, 489
1923	211, 739, 469	47, 840, 512	259, 579, 081	[4] 49, 990, 820
1924	209, 979, 999	[7]	258, 479, 999	[6]
1925	240, 160, 986	49, 175, 979	289, 336, 965	[4] 61, 471, 124
1926	277, 248, 522	[7]	326, 248, 522	[6]
Value of sales:				
1918	$6, 364, 972	$1, 863, 580	$8, 228, 552	$1, 805, 865
1919	6, 918, 549	2, 156, 471	9, 075, 020	[4] 2, 012, 723
1920	6, 378, 040	2, 010, 186	8, 388, 226	2, 109, 388
1921	5, 645, 309	2, 811, 728	8, 457, 037	[4] 2, 192, 015
1922	6, 419, 743	1, 955, 950	8, 375, 693	1, 879, 490
1923	9, 250, 552	2, 461, 691	11, 712, 243	[4] 2, 001, 363
1924	9, 623, 520	[7]	12, 293, 520	[6]
1925	11, 903, 196	2, 750, 719	14, 653, 915	[4] 2, 594, 025
1926	14, 103, 760	[7]	16, 803, 760	[6]

[1] Includes tar produced in by-product coke ovens operated by city gas companies.
[2] The figures here given for coal-gas tar include only the operations of coal-gas retorts. For 1918, 1920, and 1922 they are taken from special studies by the U. S. Geological Survey. For 1919, 1921, 1923, and 1925 figures deduced from the census as follows are used. The census figures include the tar produced in by-product ovens operated by city gas companies. A special retabulation has recently been made of the reports made to the Bureau of Mines for coke ovens operated in conjunction with city gas plants, and the totals for this group have been subtracted from the census figures.
[3] Figures for 1919, 1921, 1923, and 1925 revised, as explained in Note 2.
[4] As reported by the Bureau of the Census.
[5] Estimate based upon reported sales as given below included in total.
[6] No data.
[7] Estimate included in total.

AMMONIA

In the distillation of coal part of the nitrogen present in the raw coal is converted into ammonia and passes off with the crude gas. It may be removed by washing the gas with water or by bubbling it through diluted solutions of sulphuric acid. The first method of recovery yields ammonia liquor, which is then concentrated and may subsequently be distilled with lime for the recovery of ammonia. The content of NH_3 in the ammonia liquor produced at the coke-oven plants in 1926 was 53,523,229 pounds, equivalent to about 15 per cent of the total quantity of ammonia in all forms recovered. The second method of recovery yields ammonia sulphate and is known as the "direct recovery process." This latter method has become by far the commoner means of recovery of ammonia in the manufacture of by-product coke, and in 1926 about 85 per cent of the ammonia produced was obtained in this way. The quantity of sulphate produced as such was 1,167,859,453 pounds, and the total quantity of ammonia in all forms was equivalent to 1,381,952,369 pounds of sulphate. Table 71 shows the sulphate and liquor (NH_3 content) produced during 1926, by States.

The average yield of ammonia in 1926, including all forms recovered, was equivalent to 21.7 pounds of sulphate per net ton of coal charged. (Table 66 and fig. 25.) This was a decrease of 0.7 pound when compared with the preceding year and was 1.1 pounds less than the average in 1921, when a yield of 22.8 pounds per ton of coal coked

was recorded. The yield of ammonia, as in the case of tar and other by-products, varies with each plant, much depending upon operating conditions and quality of coal used.

TABLE 71.—*Ammonia produced at coke-oven plants, by States, in 1926, in pounds*

State	Sulphate	Liquor (NH_3 content)	Sulphate equivalent of all forms	
			Total	Per ton of coal coked
Alabama	[1]	[1]	157,997,223	23.2
Colorado	17,475,500	538,809	19,630,736	22.8
Illinois	[1]	[1]	102,636,789	21.8
Indiana	102,261,066	7,843,353	133,634,478	16.7
Maryland	27,050,540		27,050,540	17.6
Massachusetts	[1]	[1]	16,104,612	18.4
Michigan	[1]	[1]	56,099,250	22.2
Minnesota	[1]	[1]	18,633,697	20.6
New Jersey	25,703,543	696,411	28,489,187	22.6
New York	74,343,643	3,322,787	87,634,791	22.2
Ohio	[2] 580,483,761	[2] 12,305,942	249,779,300	22.8
Pennsylvania			379,928,229	22.5
Tennessee	3,529,565		3,529,565	21.4
Utah	9,536,000		9,536,000	29.2
Washington		548,361	2,193,444	32.5
West Virginia	[1]	[1]	38,332,787	23.5
Kentucky, Missouri, Rhode Island, and Wisconsin	[1]	[1]	50,741,741	23.2
Undistributed	327,475,835	28,267,566		
	1,167,859,453	53,523,229	1,381,952,369	21.7

[1] Included under "Undistributed."
[2] Figures for Ohio and Pennsylvania combined to avoid disclosing individual operations.

Slightly less ammonia was sold in 1926 than was produced. Of the amount sold, over 84 per cent was in the form of sulphate, and the total quantity of sulphate sold was 1,152,141,717 pounds. The liquor sold had a content of 53,448,034 pounds of NH_3. The sales by States are shown in Table 72. The difference between the sales and production represents net changes in stock during the year. The table also includes the average value per pound of sulphate or per pound of NH_3 content of the liquor.

TABLE 72.—*Ammonia sold by coke-oven plants, by States, in 1926*

State	Sulphate			Liquor (NH_3 content)			Total (sulphate equivalent of all forms)	
	Pounds	Value		Pounds	Value		Pounds	Value
		Total	Average		Total	Average		
Alabama	153,857,168	$3,475,807	$0.023	[1]	[1]	[1]	[1]	[1]
Colorado	15,444,948	[1]	[1]				15,444,948	[1]
Illinois	87,151,329	1,899,955	.022	[1]	[1]	[1]	[1]	[1]
Indiana	100,359,800	1,938,622	.019	7,976,042	$484,355	$0.061	132,263,968	$2,423,977
Maryland	26,278,735	[1]	[1]				26,278,735	[1]
Massachusetts	15,364,600	[1]	[1]	[1]	[1]	[1]	[1]	[1]
Michigan	[1]	[1]	[1]	9,374,564	673,598	.072	[1]	[1]
Minnesota	[1]	[1]	[1]	1,184,044	48,761	.041	[1]	[1]
New Jersey	25,058,654	[1]	[1]	709,194	[1]	[1]	27,895,416	[1]
New York	73,372,393	1,652,703	.023	3,285,238	235,688	.072	86,513,341	1,888,391
Ohio	208,956,282	4,343,565	.021	[2] 12,542,607	[2] 744,430	[2] .059	[2] 626,669,905	[2] 12,655,218
Pennsylvania	367,543,198	7,567,223	.021					
Tennessee	3,444,000	79,046	.023				3,444,000	79,046
Utah	9,308,340	[1]	[1]				9,308,340	[1]
Washington				550,926	14,902	.027	2,203,704	14,902
West Virginia	32,803,205	699,321	.021	[1]	[1]	[1]	[1]	[1]
Kentucky, Missouri, Rhode Island, and Wisconsin	[1]	[1]	[1]	11,928,823	805,767	.068	[1]	[1]
Undistributed	33,199,085	3,001,789	.024	5,896,596	462,671	.070	435,911,495	11,097,669
	1,152,141,717	24,658,031	.021	53,448,034	3,470,172	.065	1,305,933,856	28,128,203

[1] Included under "Undistributed."
[2] Figures for Ohio and Pennsylvania combined to avoid disclosing individual operations.

Although the domestic market for sulphate of ammonia was fairly active in 1926, and there was an exceptional demand from abroad due to the British coal strike, prices were lower than in 1925. (Table 73.) The average sales realization obtained by coke-oven operators in 1926 was 2.1 cents per pound, as against 2.3 cents in the preceding year. A large part of the liquor produced in this country from both coke-oven and coal-gas plants is consumed in the manufacture of chemicals and explosives and in the refrigeration industry, but the total quantities of NH_3 produced far exceed the requirements for these purposes, and the bulk of the sulphate of ammonia finds its outlet in the fertilizer trade.

TABLE 73.—*Average monthly prices of sulphate of ammonia per 100 pounds, 1911–1926*

[Quotations, 1911–1916, abstracted from Oil, Paint, and Drug Reporter, at New York; 1917–1926, from Iron Trade Review, f. o. b. producers' works. Figures for 1911–1922 compiled by C. G. Atwater, of the Barrett Co.]

Month	1911	1912	1913	1914	1915	1916	1917	1918
January	$2.97½	$3.20¾	$3.28	$2.90	$2.71¼	$3.96½	$4.12	$5.03
February	3.08¾	3.24¼	3.30	2.85	2.98¾	3.96¼	4.18	5.22½
March	3.11¼	3.28	3.30	2.85	3.16	3.92½	(1)	5.40½
April	3.11¼	3.38	3.30	2.85	3.10⅝	3.68¾	(1)	5.46
May	3.07½	3.40	3.30	2.70	3.20	3.57½	4.72½	5.59½
June	3.03¾	3.40	3.12	2.55	3.22½	3.53	4.80	5.10
July	3.07¼	3.25	3.00	2.52	3.41	3.43½	4.90	4.50
August	3.16¼	3.22½	2.98	2.60	3.53	3.58¾	4.90	4.50
September	3.16¼	3.29	3.07	2.76⅞	3.37½	3.77½	4.92½	4.50
October	3.18	3.28	3.10	2.67½	3.37½	4.02½	4.95	4.50
November	3.18	3.20⅝	3.06¼	2.67½	3.57	4.21¼	4.92½	4.50
December	3.20	3.22½	2.95	2.67½	3.93¾	4.32½	4.90	4.86
Average	3.11	3.28	3.14	2.71	3.30	3.83	4.73	4.93

Month	1919	1920	1921	1922	1923	1924	1925	1926
January	$4.68	$4.00	$3.37½	$2.20	$3.10	$2.72½	$2.67½	$2.82½
February	4.50	4.00	3.12½	2.35	3.15⅝	2.72½	2.62½	2.72½
March	4.25	4.55	2.92½	2.60½	3.19½	2.72½	2.52½	2.68½
April	4.00	4.55	2.57½	2.65	3.22½	2.65	2.52½	2.62½
May	3.80	4.55	2.45	2.67	3.21½	2.62½	2.42½	2.62½
June	3.60	4.55	2.45	2.72	3.13¾	2.57½	2.37½	2.50
July	3.40	4.55	2.35	2.82	3.10	2.50	2.67½	2.47½
August	3.53	4.80	2.00	2.82	3.07½	2.35	2.75	2.47½
September	3.53	4.80	1.95	2.90	3.02½	2.50	2.80	2.47½
October	3.57	4.25	2.20	3.05	3.01¼	2.60	2.95	2.47½
November	3.78	3.75	2.20	3.07	2.93¾	2.65	2.85	2.47½
December	3.93	3.38	2.20	3.12	2.76¼	2.67½	2.80	2.47½
Average	3.88	4.31	2.48	2.75	3.08	2.61	2.66	2.57

[1] No market.

LIGHT OIL AND ITS DERIVATIVES

BENZOL AND RELATED PRODUCTS

The market for the principal light oil derivatives was unusually strong in 1926. The expansion of the lacquer trade, which had begun in 1925, stimulated the demand for toluol and solvent naphtha, and in the latter part of 1926 this tendency was strengthened by the enforced curtailment of production of coal-tar products in Great Britain caused by the miners' strike. As a result, both spot prices and average sales realizations on toluol and solvent naphtha rose to the highest level attained since the war. (Tables 65 and 75; figs. 24 and 27.) The demand for the solvents also acted to increase the

price of motor benzol and although gasoline prices showed no great change, the average realization obtained by coke operators on their sales of motor benzol increased 2.2 cents in comparison with 1925. (Tables 65 and 74; figs. 26 and 27.)

The demand from the chemical, paint, and varnish industries, however, is still insufficient to absorb more than a small part of the total supply of light-oil products, and the bulk of the output is sold to petroleum refiners for blending with gasoline. The dominant long-time influence in the prices of the light-oil group is therefore the price of gasoline. Table 74 compares the course of retail gasoline prices represented by the average tank-wagon prices in New York, Baltimore, Chicago, Kansas City, and San Francisco, compiled by Joseph E. Pogue, with that of benzol prices as quoted in the trade journals. The relationship between benzol prices and that of other coal-tar products is shown in Table 75, which gives the monthly spot quotations for the past five years.

That the demand for motor fuel can absorb any possible increase in the production of benzol is proved by Table 76, which compares the output with that of gasoline.

TABLE 74.—*Producers' price per gallon of pure benzol f. o. b. works and tank-wagon price of gasoline, 1922–1926, by months*

[Prices of benzol are those quoted by Iron Trade Review; of tank-wagon gasoline, average for five cities computed by J. E. Pogue]

Month	1922		1923		1924		1925		1926	
	Benzol	Gasoline	Benzol	Gasoline	Benzol	Gasoline	Benzol	Gasoline	Benzol	Gasoline
January	$0.290	$0.214	$0.300	$0.193	$0.220	$0.152	$0.250	$0.141	$0.235	$0.154
February	.290	.211	.300	.201	.250	.177	.230	.175	.230	.159
March	.290	.211	.300	.206	.250	.180	.240	.180	.230	.164
April	.290	.217	.300	.199	.250	.180	.240	.175	.235	.169
May	.290	.230	.290	.189	.250	.178	.240	.174	.245	.182
June	.290	.235	.260	.195	.245	.169	.245	.181	.250	.186
July	.300	.236	.260	.194	.250	.159	.250	.184	.250	.186
August	.300	.222	.260	.172	.250	.154	.260	.177	.250	.186
September	.300	.221	.240	.151	.250	.151	.250	.151	.250	.186
October	.300	.213	.220	.142	.250	.136	.240	.148	.245	.178
November	.300	.200	.215	.131	.250	.134	.240	.150	.245	.174
December	.300	.198	.210	.131	.250	.134	.240	.152	.240	.174
Average	.295	.217	.263	.175	.247	.159	.244	.166	.242	.175

TABLE 75.—*Monthly spot prices of coal-tar products in New York market, 1922–1926*

[As quoted by Oil, Paint, and Drug Reporter. Figures are averages of high and low quotations for each month]

Month	Benzol (90 per cent), per gallon					Toluol, per gallon				
	1922	1923	1924	1925	1926	1922	1923	1924	1925	1926
January	$0.270	$0.270	$0.210	$0.230	$0.240	$0.300	$0.300	$0.260	$0.260	$0.350
February	.270	.295	.230	.220	.240	.300	.300	.260	.260	.350
March	.270	.320	.230	.220	.240	.300	.300	.260	.260	.350
April	.270	.320	.230	.220	.240	.300	.300	.260	.260	.350
May	.270	.270	.230	.215	.245	.300	.300	.260	.260	.350
June	.270	.250	.230	.230	.250	.300	.300	.260	.260	.350
July	.270	.250	.230	.240	.250	.300	.300	.260	.260	.350
August	.270	.250	.230	.240	.250	.300	.300	.260	.260	.350
September	.270	.250	.230	.240	.250	.300	.300	.260	.260	.350
October	.270	.210	.230	.240	.245	.300	.260	.260	.285	.350
November	.270	.210	.230	.235	.240	.300	.260	.260	.330	.350
December	.270	.210	.230	.240	.240	.300	.260	.260	.300	.350
Average	.270	.259	.228	.225	.244	.300	.290	.260	.271	.350

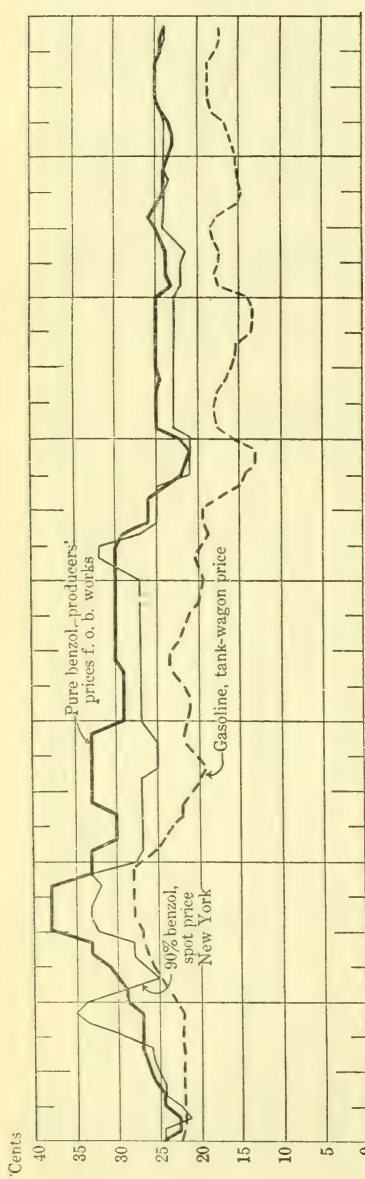

FIGURE 26.—Average price of 90 per cent benzol in New York, producers' price of pure benzol f. o. b. works, and tank-wagon price of gasoline by months, 1919–1926

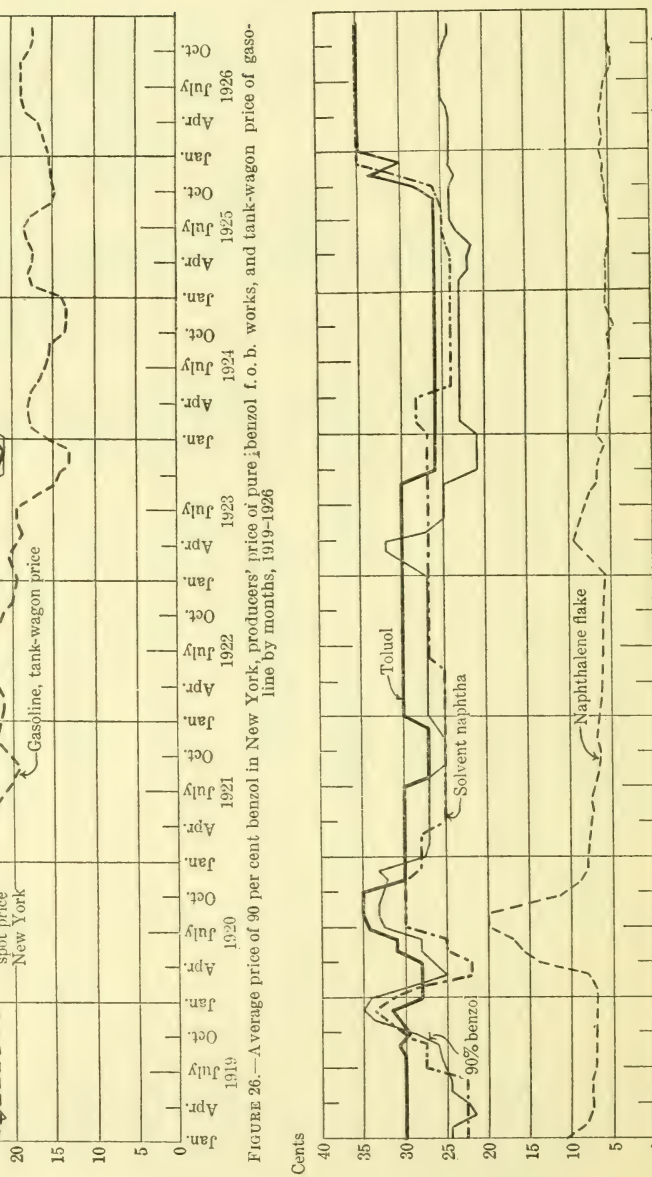

FIGURE 27.—Spot prices of 90 per cent benzol, toluol, solvent naphtha, and flake naphthalene in New York, by months, 1919–1926

TABLE 75.—*Monthly spot prices of coal-tar products in New York market, 1922–1926*—Continued

Month	Solvent naphtha, per gallon					Naphthalene flakes, per pound				
	1922	1923	1924	1925	1926	1922	1923	1924	1925	1926
January	$0.250	$0.270	$0.270	$0.240	$0.350	$0.065	$0.059	$0.065	$0.055	$0.062
February	.250	.270	.280	.240	.350	.065	.068	.063	.055	.058
March	.250	.270	.280	.240	.350	.062	.085	.061	.055	.060
April	.250	.270	.280	.240	.350	.062	.095	.055	.053	.060
May	.250	.270	.240	.245	.350	.061	.090	.053	.050	.059
June	.270	.270	.240	.250	.350	.062	.086	.050	.050	.058
July	.270	.270	.240	.250	.350	.061	.080	.050	.050	.053
August	.270	.270	.240	.250	.350	.060	.075	.050	.053	.048
September	.270	.270	.240	.255	.350	.060	.069	.053	.055	.048
October	.270	.270	.240	.260	.350	.060	.068	.045	.055	.050
November	.270	.270	.240	.305	.350	.059	.065	.050	.058	.050
December	.270	.270	.240	.350	.350	.057	.060	.055	.058	.050
Average	.262	.270	.253	.260	.350	.061	.075	.055	.054	.055

TABLE 76.—*Production of motor fuel in the United States, 1918–1926, in gallons*

Year	Gasoline production of petroleum refineries	Natural-gas gasoline (total production)	Benzol produced, all grades, including motor benzol		
			Coke ovens	Gas works, including oil and water gas	Tar refineries, etc.[1]
1918	3,570,000,000	283,000,000	44,805,000	[2] 5,633,000	3,015,000
1919	3,958,000,000	352,000,000	61,068,000	[3]	1,826,000
1920	4,883,000,000	385,000,000	72,994,000	[4] 502,000	876,000
1921	5,154,000,000	450,000,000	54,459,000	[5]	2,172,000
1922	6,202,000,000	506,000,000	70,112,000	[5]	[6] 775,000
1923	7,556,000,000	816,000,000	97,335,000	[5]	[6] 395,000
1924	8,960,000,000	934,000,000	91,904,000	[5]	[6] 630,000
1925	10,903,000,000	1,127,000,000	103,821,000	[5]	[6] 742,000
1926	12,589,000,000	1,363,000,000	112,489,000	[5]	[6] 377,000

[1] As reported to the U. S. Tariff Commission.
[2] Of this only 2,177,000 gallons were sold, the balance being returned to the gas.
[3] Data not available in comparable form.
[4] Quantity sold, used because of apparent double counting between production figures of crude and refined benzol.
[5] Can not be shown without disclosing individual returns.
[6] Does not include a small amount of motor benzol which can not be shown without disclosing individual returns.

The quantity of benzol produced and sold at coke plants, by States, is given in Table 77. The crude benzol produced amounted to 4,744,713 gallons, practically all of which was sold, at an average price of 23.8 cents. Although the output of crude benzol showed a decrease when compared with that of 1925 the production of refined and motor benzol increased. The production of refined benzol rose from 16,231,714 gallons in 1925 to 17,713,904 gallons in 1926, and that of motor benzol from 81,469,925 to 90,029,972 gallons. Sales of both refined and motor benzol nearly equaled production, and the stocks carried over to the following year were small. The average realization per gallon was 22.8 cents for refined benzol and 18.8 cents for motor benzol, as against 22 4 cents and 16.6 cents, respectively, in 1925.

TABLE 77.—*Benzol produced and sold in the United States in 1926, by States*

State	Produced (gallons)	Sold		
		Gallons	Value	
			Total	Average
Crude benzol:				
Indiana, Missouri, Pennsylvania, and Wisconsin	1,594,119	1,587,163	$372,658	$0.235
New York and Ohio	3,150,594	3,073,458	737,316	.240
	4,744,713	4,660,621	1,109,974	.238
Refined benzol:				
Colorado	436,847	426,953	(1)	(1)
New York	3,458,608	3,332,133	750,234	.225
Ohio	5,814,143	5,565,392	1,296,469	.233
Pennsylvania	3,324,097	3,381,602	790,698	.234
Alabama, Tennessee, and West Virginia	1,433,410	1,426,779	338,869	.238
Illinois, Indiana, Missouri, and Wisconsin	3,246,799	3,194,310	[1] 781,449	[1] .216
	17,713,904	17,327,169	3,957,719	.228
Motor benzol:				
Alabama	12,336,967	12,222,556	2,259,205	.185
Colorado	1,201,833	1,264,001	809,773	.197
Maryland	2,848,287	2,844,456		
Minnesota	670,527	671,414	126,249	.188
New York	8,014,352	8,040,854	1,562,805	.194
Ohio	14,362,301	14,324,479	2,860,842	.200
Pennsylvania	29,708,416	29,648,684	5,253,126	.177
Illinois and Indiana	16,050,702	15,897,636	3,130,584	.197
Michigan and Utah	2,653,464	2,378,502	435,628	.183
Tennessee and West Virginia	2,183,123	2,208,630	424,897	.192
	90,029,972	89,501,212	16,863,109	.188

[1] Colorado included with Illinois, Indiana, Missouri, and Wisconsin.

There was a marked expansion in the market for toluol in 1926, and production increased by 61 per cent in comparison with 1925. The total output, including both crude and refined toluol, amounted to 8,791,452 gallons in 1926, as against 5,457,144 gallons in 1925. The production of solvent naphtha, however, fell somewhat short of that in the previous year. In Table 78 appear the returns on production and sales of toluol and solvent naphtha in 1926.

TABLE 78.—*Toluol and solvent naphtha produced and sold in the United States in 1926, by States*

State	Toluol (crude and refined) [1]				Solvent naphtha			
	Produced (gallons)	Sold			Produced (gallons)	Sold		
		Gallons	Value			Gallons	Value	
			Total	Average			Total	Average
Alabama	191,919	181,513	$56,077	$0.309	760,910	249,630	$56,363	$0.226
Colorado	97,482	97,482	(2)	(2)	275,770	64,127	20,531	.250
Maryland					12,663	18,151		
New York	1,508,965	1,454,503	497,784	.342	595,456	523,529	191,305	.365
Ohio	2,190,016	2,102,224	720,004	.342	1,101,665	1,022,823	294,052	.287
Illinois and Indiana	981,942	937,369	318,124	.339	581,727	485,006	103,621	.214
Minnesota, Missouri, and Wisconsin	547,170	543,210	[2] 209,547	[2] .327	252,870	229,351	60,905	.266
Pennsylvania and West Virginia	3,273,958	3,334,304	1,113,216	.334	1,123,494	953,500	309,093	.324
	8,791,452	8,650,605	2,914,752	.337	4,704,555	3,546,117	1,035,870	.292

[1] Mainly refined toluol. [2] Colorado included with Minnesota, Missouri, and Wisconsin.

CRUDE LIGHT OIL

A number of the by-product coke plants, particularly those that supply gas for city use, find it more profitable to leave the light oils in the gas in order to increase its candlepower and heating value. As Table 79 shows, out of 77 plants that produced by-product coke in 1926 only 60 recovered crude light oil, and of these only 49 refined the crude to produce any derivative. The number of plants making motor benzol was 45.

TABLE 79.—*Number of plants making light oil or derivatives, by States, 1925 and 1926*

State	1925				1926			
	Total making coke	Making crude light oil	Making any refined product	Making motor benzol	Total making coke	Making crude light oil	Making any refined product	Making motor benzol
Alabama	8	8	6	6	8	8	6	6
Colorado	1	1	1	1	1	1	1	1
Illinois	6	4	3	2	6	4	3	2
Indiana	7	4	4	4	7	4	4	4
Maryland	1	1	1	1	1	1	1	1
Massachusetts	2				2			
Michigan	5	2	1	1	5	2	1	1
Minnesota	3	2	2	2	3	2	2	2
New Jersey	2				2			
New York	6	6	4	4	8	7	5	5
Ohio	13	12	10	10	13	13	11	11
Pennsylvania	9	7	6	6	10	9	8	8
Tennessee	1	1	1	1	1	1	1	1
Utah	1	1	1	1	1	1	1	1
Washington	1				1			
West Virginia	4	4	3	2	4	4	3	2
Kentucky, Missouri, Rhode Island, and Wisconsin	4	3	2		4	3	2	
	74	56	45	41	77	60	49	45

The total production of crude light oil in 1926 was 164,059,552 gallons (Table 80), an increase of 12 per cent over that of the year before. The quantity refined by the coke-oven operators was reported as 159,589,756 gallons, and the quantity sold without further treatment as 10,783,568 gallons. It will be noted that the sum of the sales and the quantity refined on the premises exceeds the total production; the excess is explained by the fact that one large company purchases from other operators in addition to refining its own crude. The average value per gallon of crude light oil sold in 1926 was 12.3 cents, or somewhat higher than in other recent years and 2 cents higher than in 1925.

The yield of light oils per ton of coal carbonized depends, in large measure, upon the coal used and also upon the kind of coke that is being made. At low temperatures the yield of light oils is greater than at high temperatures. Other factors influencing the recovery of the light oils are the efficiency of the oven and the skill used in operation. The average yield in recent years has been remarkably constant, ranging from 2.7 to 2.9 gallons per ton of coal charged. (Table 66 and fig. 25.) In 1926 the average yield for the plants recovering light oils was 2.8 gallons, slightly less than in 1924 and 1925.

TABLE 80.—*Crude light oil produced at coke-oven plants in the United States in 1926, by States, in gallons* [1]

State	Produced	Refined on the premises	State	Produced	Refined on the premises
Alabama	18, 956, 390	16, 038, 734	Ohio	33, 252, 129	29, 775, 846
Colorado	2, 700, 788	2, 684, 452	Pennsylvania	50, 026, 664	49, 733, 231
Illinois	9, 951, 928	6, 193, 345	Tennessee	468, 604	470, 947
Indiana	17, 699, 363	17, 680, 025	West Virginia	5, 600, 011	4, 974, 698
Maryland	3, 589, 233	3, 596, 264	Kentucky, Missouri, Utah, and Wisconsin	6, 605, 462	4, 435, 649
Michigan	3, 869, 161	2, 199, 400			
Minnesota	910, 706	899, 800			
New York	10, 429, 113	20, 907, 365		164, 059, 552	159, 589, 756

[1] In addition to the quantity refined on the premises, a few plants reported the sale of crude light oil. The total quantity sold in 1926 was 10,783,568 gallons, valued at $1,330,208, or 12.3 cents per gallon.

COKE-OVEN GAS

As gas has now become the most valuable of coke-oven by-products (fig. 23), it is significant to note the gradual increase in the proportion

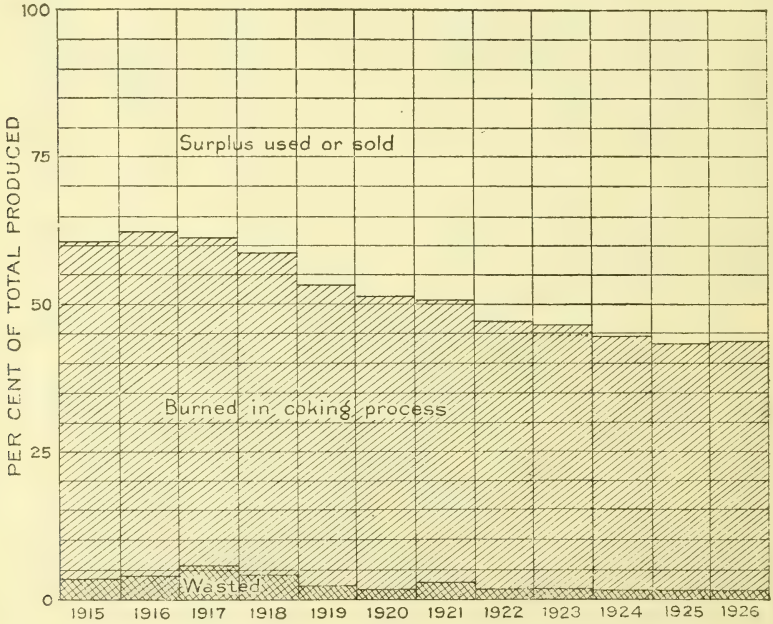

FIGURE 28.—Disposition of gas produced at by-product ovens, 1915–1926

of surplus gas available for sale and the concomitant decrease in the quantities wasted and used in operation. (See Table 81 and fig. 28.) More efficient ovens have been designed and installed and, at plants supplying gas for city use, operators have been utilizing lean gases such as blue water and producer gas for oven heating, thus making available for sale more and more of the richer gas. The result of this movement is demonstrated by the fact that in 1915 the surplus constituted only 39.5 per cent of total quantity produced, while in 1926 it had risen to 56.3 per cent.

The effort to increase the percentage of surplus gas has been stimulated by the higher prices obtainable since the war. The trend of gas prices since 1913 is shown in Table 87. Whereas the period since 1913 has witnessed violent fluctuations in the price of coal-tar crudes, the direction of gas prices has been generally upward, and as already noted the surplus gas has become the chief auxiliary source of revenue at by-product works and yields an amount approaching that realized from the sale of the tar, ammonia, and light-oil products combined. (Fig. 23.)

In 1926, 77 plants reported the production of coke-oven gas. Their combined output was 706,681,828,000 cubic feet. (Table 82.) Of this quantity approximately 296,431,000,000 cubic feet was burned in the ovens to produce the coke; 397,914,000,000 cubic feet was surplus gas, either sold or used about the plant for some purpose not immediately connected with coking; and 12,337,000,000 cubic feet was reported as wasted, including leakage and gas for which no use could be found.

TABLE 81.—*Disposition of gas from by-product coke ovens, 1915–1926, in per cent*

Year	Wasted	Burned in coking process	Surplus sold or used (not for ovens)	Year	Wasted	Burned in coking process	Surplus sold or used (not for ovens)
1915	3.2	57.3	39.5	1921	2.9	47.4	49.7
1916	4.0	58.4	37.6	1922	1.9	45.9	52.2
1917	5.4	55.7	38.9	1923	2.1	44.9	53.0
1918	4.1	54.8	41.1	1924	2.0	42.4	55.6
1919	2.6	51.0	46.4	1925	1.8	41.6	56.6
1920	2.2	49.5	48.3	1926	1.7	42.0	56.3

The gas wasted constituted but 1.7 per cent of the total production; 42 per cent went to heat the coke ovens, leaving a surplus of 56.3 per cent, a slightly lower proportion than in 1925, when the surplus gas represented 56.6 per cent of the total produced. The disposition of the surplus gas is shown in Tables 83 to 85. The amount used under boilers in the coke plants forms only a small part of the total output, rarely exceeding 10 per cent, and in 1926 was but 3.7 per cent. That the steel industry still affords the principal outlet for coke-oven gas is seen by the fact that somewhat more than one-third of the total production, equivalent to about 63 per cent of the surplus gas, was absorbed by steel or other affiliated plants. The remaining 17.3 per cent of the total production in 1926 was sold for other purposes, including domestic cooking and lighting, street lighting, and various industrial uses. The relative proportions used for each of these last-named purposes can not be stated, because the companies do not have the necessary records. In an effort to ascertain the quantities delivered to large industries direct by the by-product operators without the assistance of a public utility distributing system information has been collected since 1922 showing the quantity sold for general industrial purposes. (See Table 85.) In 1926 this amounted to 32,553,000,000 cubic feet, or 4.6 per cent of the entire production. Unquestionably, however, a considerable part of the quantity distributed through city mains in addition to the amount specified above, was used for industrial purposes.

TABLE 82.—*Coke-oven gas produced and sold in the United States in 1926, by States*

State	Number of plants	Produced (M cubic feet)	Used in process (M cubic feet)	Sold or used			Wasted (M cubic feet)
				M cubic feet	Value		
					Total	Average	
Alabama	8	77,735,530	35,843,896	40,364,855	$2,745,771	$0.068	1,526,779
Colorado	1	10,172,150	4,141,900	5,891,425	(1)	(1)	138,825
Illinois	6	48,708,473	18,194,760	30,037,188	8,051,453	.268	476,525
Indiana	7	86,338,419	38,957,345	45,774,994	10,877,190	.238	1,606,080
Maryland	1	18,414,050	7,118,300	11,295,750	(1)	(1)	
Massachusetts	2	8,762,931	3,977,485	4,756,386	(1)	(1)	29,060
Michigan	5	27,200,783	11,388,870	15,796,733	4,570,821	.289	15,180
Minnesota	3	10,274,748	5,129,049	5,130,023	1,461,785	.285	15,676
New Jersey	2	15,803,839	4,434,663	11,369,176	(1)	(1)	
New York	8	40,925,447	16,253,776	24,171,042	5,720,779	.237	500,629
Ohio	13	121,422,314	50,057,533	67,630,112	7,731,396	.114	3,734,669
Pennsylvania	10	193,828,548	82,513,506	108,486,844	11,560,528	.107	2,828,198
Tennessee	1	1,576,958	703,063	873,895	168,813	.193	
Utah	1	3,588,882	1,492,975	1,545,955	(1)	(1)	549,952
Washington	1	678,559		653,155	845,914	1.30	25,404
West Virginia	4	17,916,412	7,234,100	10,024,943	1,322,259	.132	657,369
Kentucky, Missouri, Rhode Island, and Wisconsin	4	23,333,785	8,989,235	14,111,612	2,088,794	.148	232,938
Undistributed					7,541,297	.216	
	77	706,681,828	296,430,456	397,914,088	64,686,800	.163	12,337,284

[1] Included under "Undistributed."

Tables 83 and 84 give details of the distribution of gas, by States. The market for gas, of course, varies with the industries of the locality and with the density of population. In the centers of steel production in Pennsylvania and Ohio, in the Buffalo, Chicago, and Birmingham districts, and at the plant at Pueblo, Colo., the bulk of the surplus gas is delivered to affiliated steel works or used under boilers at the by-product plants themselves. At other plants, either owned by public utilities or supplying them with gas under contract, the greater part of the output is distributed through city mains. This condition prevailed in Massachusetts, Michigan, Minnesota, New Jersey, Tennessee, Washington, Missouri, Rhode Island, and Wisconsin, in that part of Indiana outside of the Chicago district, and even at a number of plants in the Chicago district itself.

TABLE 83.—*Use of by-product oven gas in the United States in 1926, by States*

State	Used under boilers			Used in steel or other affiliated plants			Distributed through city mains			Sold for industrial purposes		
	M cubic feet	Value		M cubic feet	Value		M cubic feet	Value		M cubic feet	Value	
		Total	Average		Total	Average		Total	Average		Total	Average
Alabama	14,239,022	$653,423	$0.046	20,689,333	$1,467,885	$0.071	(1)	(1)	(1)	(1)	(1)	(1)
Colorado				5,891,425	(1)	(1)						
Illinois	(1)	(1)	(1)	(1)	(1)	(1)	19,852,598	$6,422,788	$0.324	4,358,581	$934,604	$0.214
Indiana	504,145	42,288	.084	34,788,361	5,221,460	.150	5,189,220	4,512,828	.870	5,263,268	1,100,614	.209
Maryland				6,081,623	(1)	(1)	5,214,127	(1)	(1)			
Massachusetts							(1)	(1)	(1)	(1)	(1)	(1)
Michigan	(1)	(1)	(1)	(1)	(1)	(1)	12,022,223	3,347,048	.278	(1)	(1)	(1)
Minnesota	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)			
New Jersey							11,369,176	(1)	(1)			
New York	1,358,289	96,488	.071	13,857,957	1,484,201	.107	6,659,006	3,408,233	.512	2,295,790	731,857	.319
Ohio	4,077,103	312,624	.077	50,710,319	5,956,853	.117	1,488,629	358,428	.241	11,354,061	1,103,491	.097
Pennsylvania	(1)	(1)	(1)	100,282,436	9,952,877	.099	6,377,212	1,453,450	.228	(1)	(1)	(1)
Tennessee	230,980	8,084	.035				642,915	160,729	.250			
Utah	140,030	(1)	(1)	1,292,000	(1)	(1)	56,722	(1)	(1)	57,233	(1)	(1)
Washington	3,167	2,468	.779				649,988	$43,446	1.30			
West Virginia	(1)	(1)	(1)	6,788,984	564,160	.083				(1)	(1)	(1)
Kentucky, Missouri, Rhode Island, and Wisconsin	(1)	(1)	(1)				9,588,357	1,820,366	.190	(1)	(1)	(1)
Undistributed	5,401,170	323,324	.058	9,458,211	3,308,138	.146	10,455,780	7,651,681	.282	9,194,677	1,442,964	.156
	25,953,576	1,438,699	.055	249,840,649	27,955,574	.112	89,565,953	29,978,997	.335	32,553,610	5,313,530	.163

[1] Included under "Undistributed."

TABLE 84.—*Yield and disposal of gas and number of plants, supplying gas for certain uses, by States, in 1926*

State	Yield of gas (M cubic feet) per ton of coal coked	Disposal (per cent of total)						Number of plants	
		In coke plants		To steel or other affiliated plants	For distribution through city mains	For industrial purposes	Wasted	Supplying gas for city distribution	Supplying gas to steel or other affiliated plants
		For use in heating coke ovens	For use under boilers						
Alabama	11.4	46.1	18.3	26.6	(1)	(1)	2.0	2	3
Colorado	11.8	40.7		57.9			1.4		1
Illinois	10.3	37.3	(1)	(1)	40.8	8.9	1.0	5	2
Indiana	10.8	45.1	.6	40.3	6.0	6.1	1.9	5	5
Maryland	12.0	38.7		33.0	28.3			1	1
Massachusetts	10.0	45.4			(1)	(1)	(1)	2	
Michigan	10.8	41.9	(1)	(1)	44.1	(1)	.1	5	2
Minnesota	11.4	49.9	(1)	(1)	(1)		.2	2	1
New Jersey	12.5	28.1			71.9			2	
New York	10.4	39.7	3.3	33.9	16.3	5.6	1.2	3	3
Ohio	11.1	41.2	3.4	41.8	1.2	9.3	3.1	3	10
Pennsylvania	11.5	42.6	(1)	51.7	3.3	(1)	1.5	5	8
Tennessee	9.6	44.6	14.6		40.8			1	
Utah	11.0	41.6	3.9	36.0	1.6	1.6	15.3	1	1
Washington	10.0		.5		95.7		3.8	1	
West Virginia	11.0	40.4	(1)	37.9		(1)	3.7		2
Kentucky, Missouri, Rhode Island, and Wisconsin	10.7	38.5	(1)		41.1	11.4	(1)	3	
	11.1	42.0	3.7	35.3	12.7	4.6	1.7	43	39

[1] Not at liberty to publish.

TABLE 85.—*Disposition of gas from by-product ovens in the United States, 1921–1926*

	Millions of cubic feet	Percentage of total production	Value	
			Total	Cents per M
1921				
Used under boilers	12,123	3.9	$1,120,087	9.2
Used in steel or other related plants	98,352	31.7	10,593,204	10.8
Distributed through city mains, including sales to nonaffiliated industries	43,826	14.1	14,249,961	32.5
Total sold or used (not for ovens)	154,301	49.7	25,963,252	16.8
Used in heating ovens	147,038	47.4		
Wasted	8,850	2.9		
Total produced	310,189	100.0		
1922				
Used under boilers	19,124	4.3	1,251,325	6.5
Used in steel or other related plants	144,976	32.7	15,942,446	11.0
Distributed through city mains	56,930	12.9	20,326,648	35.7
Sold for industrial purposes	10,353	2.3	1,104,901	10.7
Total sold or used (not for ovens)	231,383	52.2	38,625,320	16.7
Used in heating ovens	203,239	45.9		
Wasted	8,049	1.9		
Total produced	442,671	100 0		
1923				
Used under boilers	33,741	5.6	1,820,808	5.4
Used in steel or other related plants	200,099	33.3	22,646,134	11.3
Distributed through city mains	65,143	10.8	23,116,578	35.5
Sold for industrial purposes	19,459	3.3	4,025,700	20.7
Total sold or used (not for ovens)	318,442	53.0	51,609,220	16.2

TABLE 85.—*Disposition of gas from by-product ovens in the United States, 1921-1926*—Continued

	Millions of cubic feet	Percentage of total production	Value	
			Total	Cents per M
1923—Continued				
Used in heating ovens	270,168	44.9		
Wasted	12,545	2.1		
Total produced	601,155	100.0		
1924				
Used under boilers	29,794	5.5	$4,729,013	5.8
Used in steel or other related plants	187,172	34.6	27,907,607	14.2
Distributed through city mains	65,677	12.1	23,439,410	35.8
Sold for industrial purposes	18,561	3.4	3,561,911	19.2
Total sold or used (not for ovens)	301,204	55.6	49,784,947	16.5
Used in heating ovens	229,298	42.4		
Wasted	10,599	2.0		
Total produced	541,101	100.0		
1925				
Used under boilers	23,253	3.9	4,451,238	5.8
Used in steel or other related plants	239,030	30.0	26,580,057	11.5
Distributed through city mains	77,137	12.1	29,310,200	37.9
Sold for industrial purposes	29,528	4.6	4,333,000	14.7
Total sold or used (not for ovens)	362,254	56.6	64,454,219	17.0
Used in heating ovens	266,112	41.6		
Wasted	11,278	1.8		
Total produced	639,644	100.0		
1926				
Used under boilers	25,954	3.7	1,438,000	5.5
Used in steel or other related plants	249,841	35.3	27,955,374	11.2
Distributed through city mains	89,506	12.7	29,978,907	33.5
Sold for industrial purposes	32,553	4.6	5,313,530	16.3
Total sold or used (not for ovens)	397,914	56.3	64,686,800	16.3
Used in heating ovens	296,431	42.0		
Wasted	12,337	1.7		
Total produced	706,682	100.0		

Within the range of the temperatures employed in present by-product coking practice the yield of gas per ton of coal charged is largely affected by the character of the coal used and depends to a lesser extent upon the method of oven operation and the design of the oven itself and still less upon the skill of the operator. The statistics of the yield of gas per ton of coal carbonized are therefore not to be used as a measure of plant-operating efficiency. They do, however, represent the results obtained under actual conditions of operation and with the coals available in different localities. The average yield, by States, is shown in the first column of Table 84. The averages per plant range from less than 10,000 cubic feet per ton of coal carbonized to over 12,000 cubic feet. In 1926 the average for all plants was 11,100 cubic feet.

The rate at which the output of natural gas and manufactured gas has been increasing is given in Table 86 and Figure 29. It will be seen that the consumption of gas has been greatly augmented since 1913 and that increasing proportions have been supplied by the coke-oven surplus. All forms of gas fuel have participated in this

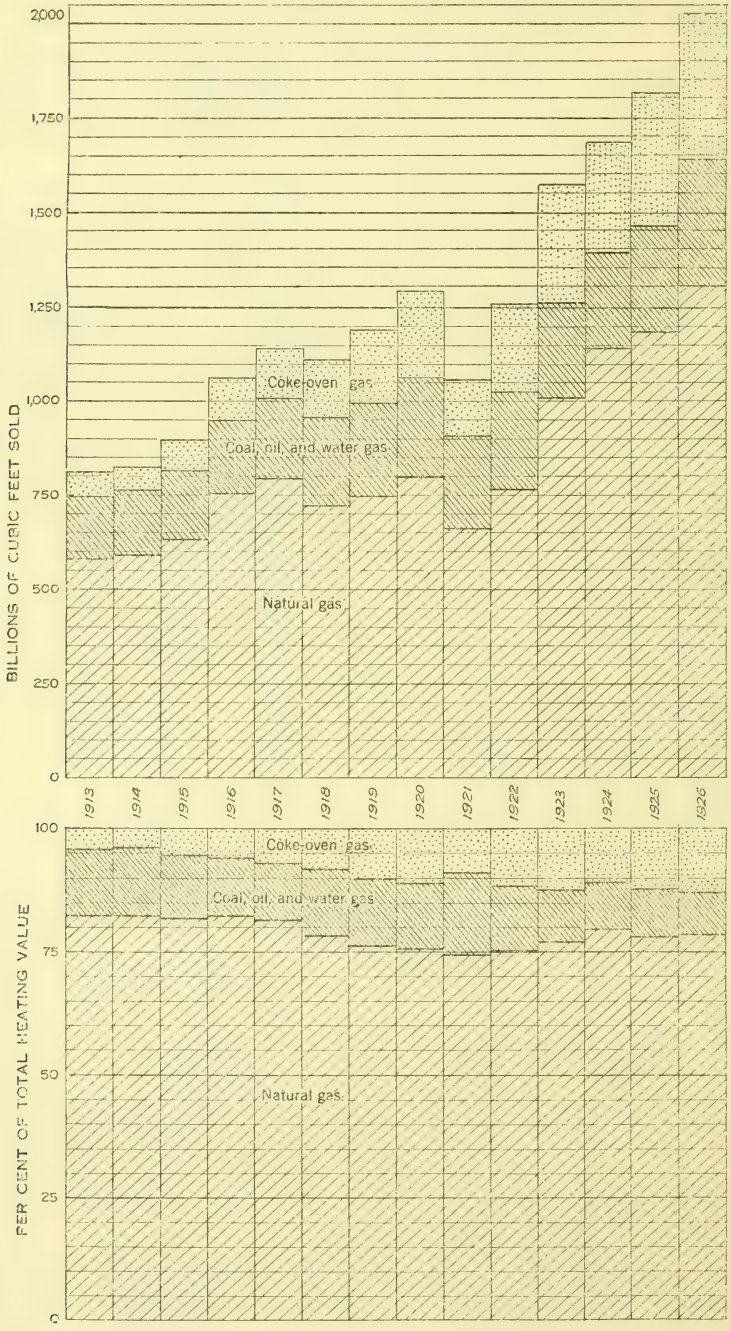

FIGURE 29.—Growth of sales of surplus coke-oven gas, other manufactured gas, and natural gas, and percentage that each formed of the total heating value of all gas sold

TABLE 86.—*Total production of gas fuel in the United States, 1913–1926*

[Does not include producer gas, blast-furnace gas, Pintsch gas, or acetylene]

Year	Quantity sold (billion cubic feet)				Rough equivalent in heating value (billion British thermal units)			
	1	2	3	4	5	6	7	8
	Surplus coke-oven gas	Coal, oil, and water gas	Natural gas	Total	Surplus coke-oven gas (1×550)	Coal, oil, and water gas (2×525)	Natural gas (3×1,075)	Total (5+6+7)
QUANTITY								
1913	64	[1] 166	582	812	35,200	95,450	626,000	756,650
1914	91	174	592	827	33,550	100,050	636,000	769,600
1915	84	[1] 182	639	905	46,200	104,650	687,000	837,850
1916	110	196	703	1,009	60,500	112,700	756,000	929,200
1917	131	[1] 211	795	1,137	72,050	121,325	855,000	1,048,375
1918	158	234	721	1,113	86,900	134,550	776,000	997,450
1919	193	[1] 248	746	1,187	106,150	142,600	802,000	1,050,750
1920	230	262	798	1,290	126,500	150,650	858,000	1,135,150
1921	154	[1] 269	662	1,085	84,700	154,675	712,000	951,375
1922	231	257	763	1,251	127,050	147,775	820,000	1,094,825
1923	318	[2] 258	1,007	1,583	174,900	148,350	1,083,000	1,407,250
1924	301	[3] 260	1,142	1,703	165,550	149,500	1,227,850	1,542,950
1925	362	[2] 283	1,189	1,834	199,100	162,725	1,278,175	1,640,000
1926	398	[4] 290	1,313	2,001	218,900	166,750	1,411,475	1,797,125
PER CENT								
1913	7.9	20.5	71.6	100.0	4.7	12.6	82.7	100.0
1914	7.4	21.0	71.6	100.0	4.4	13.0	82.6	100.0
1915	9.4	20.3	70.3	100.0	5.6	12.6	81.8	100.0
1916	10.4	18.5	71.1	100.0	6.2	11.5	82.3	100.0
1917	11.5	18.6	69.9	100.0	6.9	11.6	81.5	100.0
1918	14.2	21.0	64.8	100.0	8.7	13.5	77.8	100.0
1919	16.3	20.9	62.8	100.0	10.1	13.6	76.3	100.0
1920	17.8	20.3	61.9	100.0	11.1	13.3	75.6	100.0
1921	14.2	24.8	61.0	100.0	8.9	16.3	74.8	100.0
1922	18.5	20.5	61.0	100.0	11.6	13.5	74.9	100.0
1923	20.1	16.3	63.6	100.0	12.4	10.6	77.0	100.0
1924	17.7	15.3	67.0	100.0	10.7	9.7	79.6	100.0
1925	19.7	15.4	64.9	100.0	12.1	9.9	78.0	100.0
1926	19.9	14.5	65.6	100.0	12.2	9.3	78.5	100.0

[1] Estimated by assuming a uniform rate of increase between successive years reported.

[2] Total sales of manufactured gas by city gas companies as reported by the Bureau of the Census, minus gas purchased for mixing and resale, minus sales of gas made in by-product ovens operated by city gas companies as determined by a special tabulation made by the Bureau of Mines in 1927.

[3] Estimated.

[4] Estimated; subject to revision.

TABLE 87.—*Trend in prices of gas per thousand cubic feet, 1913–1926*

Year	Average price to householders [1]		Average value of all gas sold [2]		
	Manufactured gas (44 cities)	Natural gas (8 cities)	Natural gas [3]	Coal, oil, and water gas	Coke-oven surplus gas [4]
1913	$0.95	$0.34	$0.151	[5] $0.91	$0.088
1914	.94	.34	.159	[6]	.098
1915	.93	.34	.161	.91	.102
1916	.92	.34	.160	[6]	.098
1917	.91	.35	.179	.87	.087
1918	.95	.39	.213	.91	.087
1919	1.04	.44	.216	[6]	.086
1920	1.09	.44	.246	1.06	.140
1921	1.32	.49	.264	1.23	.168
1922	1.29	.54	.231	1.16	.167
1923	1.25	.55	.248	[7] 1.11	.162
1924	1.24	.59	.222	[6]	.165
1925	1.23	.65	.225	[7] 1.10	.170
1926	1.23	.66	.228	[6]	.164

[1] Average of prices in effect on or near Apr. 15; from statistics of prices published by the Bureau of Labor Statistics. The figures for manufactured gas are the average net price per 1,000 cubic feet when 3,000 cubic feet are purchased, which amount the Bureau of Labor Statistics estimates to be the consumption of a typical family. Similarly the figures for natural gas are the average net price per 1,000 cubic feet when 2,000 cubic feet are purchased. These figures differ slightly from those given in the corresponding table of Mineral Resources, 1924, Part II, p. 654, which related to the price for the first 1,000 cubic feet purchased.

[2] As reported by operators to the Bureau of Mines.

[3] Average value of all natural gas at point of consumption or at town border when sold to local distributing company.

[4] Includes value of gas used by producer (not for ovens).

[5] Represents 1912.

[6] No report.

[7] Average value of all gas sold by city gas plants as reported by the census of manufactures, including coke-oven gas used for city distribution.

expanded market. The sales of coal, oil, and water gas increased 75 per cent from 1913 to 1926 and the sales of natural gas more than doubled, but the sales of coke-oven gas increased sixfold. In such comparisons, however, due allowance should be made for the higher heating value of natural gas which averages about 1,075 British

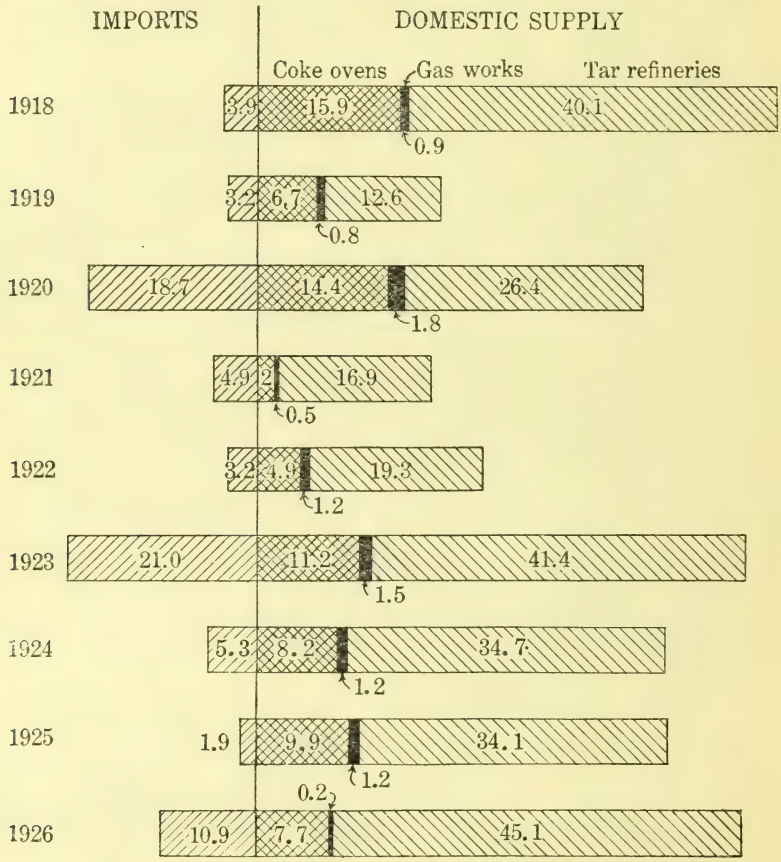

FIGURE 30.—Sources of the supply of naphthalene available in the United States, 1918–1926. Figures in bars represent millions of pounds

thermal units per cubic foot, as compared to 550 or 575 British thermal units for manufactured gas. Even on this basis coke-oven gas has shown a notable increase, for it has risen from 4.7 per cent of the total heating value of gas fuel in 1913 to 12.2 per cent in 1926. Table 87 shows the trend in prices of gas.

NAPHTHALENE

The amount of naphthalene produced at coke plants depends in large measure upon the price which this and related products command. High prices of pure benzol and toluol, inducing careful refining of the light oil into its several constituents, will produce large amounts of naphthalene; or if the price of naphthalene rises sufficiently, it may be recovered for its own value. The years of maximum production at the by-product plants were 1917 and 1918, when 17,276,000 and 15,890,000 pounds respectively, were recovered and sold. Since that time production has varied surprisingly between wide ranges with little regard to the quantity of coke produced. (Table 88.)

In 1926 the production of both crude and refined naphthalene totaled 7,886,522 pounds, a decrease of 15 per cent when compared with the 1925 output. Of this amount 7,723,223 pounds was sold, the average receipts being 1.3 cents per pound. The total value of the sales was $97,310, a credit of only 2 mills per ton of coke produced.

TABLE 88.—*Naphthalene sold by by-product-coke operators, 1918–1926*

Year	Quantity (pounds)			Value	Average receipts per pound (cents)		Receipts per ton of coke (cents)
	Crude	Refined	Total		Crude	Refined	
1918	10,403,758	5,486,689	15,890,447	$650,229	2.8	6.6	2.5
1919	4,038,455	2,663,585	6,702,040	191,364	2.0	4.1	.8
1920	11,507,703	2,941,059	14,448,762	487,974	2.7	6.1	1.6
1921	1,652,466	331,057	1,983,523	59,335	2.5	5.6	.3
1922	3,298,851	1,589,084	4,887,935	131,252	1.6	5.0	.5
1923	10,047,427	1,198,206	11,245,633	239,699	1.7	5.5	.6
1924	7,891,116	327,957	8,219,073	128,208	1.5	3.6	.4
1925	9,692,185	208,332	9,900,517	97,493	1.0	2.5	.2
1926	7,556,372	166,851	7,723,223	97,310	1.3	(1)	.2

[1] Quantity sold too small to be representative.

As a source of revenue to the coke-oven operator, naphthalene is thus of small consequence, but as a raw material for the manufacture of dyes and organic chemicals it occupies an important place. Table 89 and Figure 30 have been prepared to show the quantities available in the United States. The chief element in the supply is the product of the tar refiners, which in 1926 contributed a total of 45,165,957 pounds, or nearly six times as much as the coke plants and gas works combined. At times considerable quantities are also imported, and in 1926 the imports of crude naphthalene amounted to 6,962,719 pounds.

Spot prices of refined flake naphthalene are given in Table 75 and Figure 27. The spot market was unsettled in 1926, but the average for the year was slightly higher than in 1925.

TABLE 89.—*Total commercial production of naphthalene from all sources in the United States, 1918–1926*

[Total sales are shown for coke plants and gas works to avoid double counting in production of crude and refined]

	By-product coke ovens; sales of crude and refined	City gas works; sales of crude and refined	Tar distilleries and all other establishments	Total commercial production
Quantity (pounds):				
1918	15,890,447	896,080	40,138,092	56,924,619
1919	6,702,040	(1)	12,612,203	20,114,243
1920	14,448,762	1,760,293	26,393,411	42,602,466
1921	1,983,523	(1)	16,949,464	19,432,987
1922	4,887,935	(1)	19,323,393	25,411,328
1923	11,245,633	1,115,563	41,453,002	53,814,198
1924	8,219,073	(1)	34,683,803	44,102,876
1925	9,900,517	1,266,037	34,135,175	45,301,729
1926	7,723,223	(1)	45,165,957	53,059,180
Value:				
1918	$650,229	$14,282	$1,281,440	$1,945,951
1919	191,364	(1)	327,201	542,565
1920	487,974	63,449	791,403	1,342,826
1921	59,335	(1)	380,167	462,502
1922	131,252	(1)	352,957	536,209
1923	239,699	42,247	652,148	934,094
1924	128,208	(1)	441,333	602,541
1925	97,493	34,751	519,773	652,017
1926	97,310	(1)	494,986	594,296

	Imports of crude (free)[2]	Imports of refined (dutiable)[2]	Total imports[2]	Total produced and imported	Average spot price of flake in New York (cents per pound)
Quantity (pounds);					
1918	3,902,731	2,795	3,905,526	60,830,145	----------
1919	3,239,256	7,650	3,246,906	23,361,149	----------
1920	15,012,096	3,697,562	18,709,658	61,312,124	----------
1921	4,295,806	441,685	4,937,491	24,370,478	----------
1922	3,144,332	75,680	3,220,012	28,631,340	----------
1923	20,992,439	9,605	21,002,044	74,816,242	----------
1924	5,266,708	4,549	5,271,257	49,374,133	----------
1925	1,979,612	----------	1,979,612	47,281,341	----------
1926	6,962,719	424	6,963,143	60,022,323	----------
Value:					
1918	$130,098	$171	$130,269	$2,076,220	9.9
1919	92,265	384	92,649	635,214	7.6
1920	530,219	416,172	946,391	2,289,217	12.7
1921	135,943	31,458	167,401	629,903	7.2
1922	54,029	7,684	61,713	597,922	6.1
1923	575,563	194	575,757	1,509,851	7.5
1924	96,491	1,147	97,638	700,179	5.5
1925	26,593	----------	26,593	678,610	5.4
1926	126,088	125	126,213	720,509	5.5

[1] Data lacking or incomplete. Estimate included in total.
[2] Imports entered for consumption as reported by Tariff Commission.

BY-PRODUCT COKE OVENS OWNED BY CITY GAS COMPANIES, INCLUDED BY THE BUREAU OF THE CENSUS IN THE MANUFACTURED-GAS INDUSTRY

Reference has already been made (p. 594) to the group of by-product coke plants installed by city gas companies, which the Bureau of the Census classifies as a part of the "Manufactured-gas industry" and which the Bureau of Mines includes with the by-product coke industry.

The difference in classification is maintained by the two offices advisedly, in the interest of those who use the statistics. For some

purposes the census grouping is the more useful and for others—particularly the design of ovens, technique of manufacture, and the supply and demand for coal and coke—the grouping used by the Bureau of Mines is the more significant.

To compare or combine the two sets of figures, however, it is necessary to allow for the difference in classification. This allowance can be made by means of the data in Table 90, prepared for the purpose by the Bureau of Mines. The table shows in parallel columns separate figures for the group of by-product coke plants operated by city gas companies (grouped by the Bureau of the Census with the manufactured-gas industry) and for all other by-product coke plants. Thus in 1926 there were 15 plants in the group owned by city gas companies, and they produced 1,481,806 tons of coke, 23,720,870,000 cubic feet of gas, 19,386,285 gallons of tar, 10,964,073 pounds of ammonia (NH_3 equivalent of all forms), and 1,870,086 gallons of crude light oil. Corresponding figures for each year from 1918 to 1924 are given in "Coke and By-Products in 1925," pages 610 to 615. By subtracting the production from the Census figures for the manufactured-gas industry, any one interested may obtain the quantities of the several products produced by gas works proper; that is, coal, oil, and water gas plants.

The table also shows the operations of the 62 plants not owned by city gas companies, which in 1926 produced 42,894,780 tons of coke, 682,960,958,000 cubic feet of gas, 510,100,089 gallons of tar, 334,524,019 pounds of NH_3, and 162,189,466 gallons of crude light oil. This group of plants is that covered by the Census classification of "Coke, not including gas-house coke, made in by-product ovens." The figures are compiled by the Bureau of Mines from the reports of the coke producers and are accepted by the Bureau of the Census as its record of production in the years covered by the census of manufactures.

The totals for both groups of plants given in the last column of the table are the figures for the by-product coke industry as defined by the Bureau of Mines and given in the other tables of this report.

TABLE 90.—*Production of coke, breeze, gas, and by-products at by-product coke plants owned by city gas companies (public utilities) and included by the Bureau of the Census in the manufactured-gas industry, and at all other by-product coke plants, 1925–26*

Product.	1925			1926		
	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)[1]	Total	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)[1]	Total
Total value	$315,031,928	$21,560,885	$336,592,813	$364,773,079	$23,726,899	$388,499,978
Number of plants	61	13	74	62	15	77
Coke:						
Production—net tons	38,786,990	1,125,169	39,912,159	42,894,780	1,481,806	44,376,586
Value	$201,919,090	$8,908,481	$210,827,571	$239,495,536	$11,252,997	$250,748,533
Average value	$5.21	$7.92	$5.28	$5.58	$7.59	$5.65
Screenings and breeze:						
Production—net tons	3,434,031	112,068	3,546,099	4,036,342	147,111	4,183,453
Sales—do	838,683	10,761	849,444	922,215	14,077	936,292
Value	$3,011,352	$28,366	$3,039,718	$3,232,439	$49,237	$3,281,676
Average value	$3.59	$2.63	$3.58	$3.51	$3.50	$3.50
By-products:						
Gas—						
Production—M cubic feet	621,407,582	18,236,480	639,644,062	682,960,958	23,720,870	706,681,828
Sales of surplus—						
Used under boilers—						
Quantity—M cubic feet	25,097,467	141,605	25,239,072	25,896,101	57,775	25,953,876
Value	$1,429,399	$21,854	$1,451,253	$1,431,698	$7,001	$1,438,699
Used in steel or affiliated plants—						
Quantity—M cubic feet	229,989,920	40,405	230,030,325	249,733,077	107,572	249,840,649
Value	$26,353,561	$27,096	$26,380,657	$27,911,622	$43,952	$27,955,574
Distributed through city mains—						
Quantity—M cubic feet	66,465,103	10,992,159	77,457,262	74,444,117	15,121,836	89,565,953
Value	$18,770,746	$10,548,563	$29,319,309	$20,324,506	$9,654,491	$29,978,997
Sold for industrial use—						
Quantity—Mcubic fe et	28,625,622	901,991	29,527,613	31,403,969	1,149,641	32,553,610
Value	$3,926,659	$406,341	$4,333,000	$4,546,371	$767,159	$5,313,530
Tar—						
Production—gallons	467,344,530	13,504,284	480,848,814	510,100,089	19,386,285	529,486,374
Sales—						
Quantity—do	225,533,874	14,627,112	240,160,986	258,129,942	19,118,580	277,248,522
Value	$11,107,156	$796,040	$11,903,196	$13,035,051	$1,068,709	$14,103,760
Average value	$0.049	$0.054	$0.049	$0.050	$0.056	$0.051
Ammonia—						
Production (NH_3 equivalent of all forms)—pounds	310,744,721	8,764,684	319,509,405	334,524,019	10,964,073	345,488,092
Liquor (NH_3 equivalent)—						
Production—pounds	57,425,326	7,830,441	65,255,767	45,746,992	7,776,237	53,523,229
Sales—do	47,128,790	7,680,545	54,809,335	46,036,002	7,412,032	53,448,034
Value	$4,385,501	$581,384	$4,966,885	$3,130,136	$340,036	$3,470,172
Sulphate—						
Production—pounds	1,013,277,580	3,736,970	1,017,014,550	1,155,108,108	12,751,345	1,167,859,453
Sales—do	986,179,337	3,497,183	989,676,520	1,141,118,836	11,022,881	1,152,141,717
Value	$22,464,765	$82,143	$22,546,908	$24,411,574	$246,457	$24,658,031
Crude light oil—						
Production—gallons	145,285,887	1,157,219	146,443,106	162,189,466	1,870,086	164,059,552
Sales—do	9,719,992	481,908	10,201,900	10,048,590	734,978	10,783,568
Value	$1,002,813	$49,772	$1,052,585	$1,233,015	$97,193	$1,330,208
Light-oil derivatives—						
Production—gallons	115,885,817	502,803	116,388,620	129,176,917	935,389	130,112,306
Sales—do	112,552,884	505,818	113,058,702	124,103,873	906,154	125,010,027
Value	$20,431,928	$109,844	$20,541,772	$25,776,115	$198,653	$25,974,768
Naphthalene—						
Crude—						
Production—pounds	9,154,771	84,119	9,238,890	7,665,462	81,359	7,746,821
Sales—do	9,608,066	84,119	9,692,185	7,475,013	81,359	7,556,372
Value	$91,368	$1,001	$92,369	$95,196	$1,014	$96,210
Refined—						
Production—pounds	1,018		1,018	139,701		139,701
Sales—do	208,332		208,332	166,851		166,851
Value	$5,124		$5,124	$1,100		$1,100
All other products, value	$132,466		$132,466	$148,720		$148,720

[1] Includes all by-product ovens built by city gas companies, some of which are operated in conjunction with coal, oil, and water gas plants. Does not include independent by-product plants which may sell gas to public utility companies for distribution.

Both groups of by-product plants have been increasing in number and in volume of output. (Table 91.) The number of public utility plants rose from 9 in 1918 to 15 in 1926, and their sales of surplus gas increased in the same period from 7,450,191,000 to 16,436,824,000 cubic feet. At the same time, however, the sales of the plants not owned by city gas companies increased even more, rising from 150,908,288,000 cubic feet in 1918 to 381,477,264,000 in 1926. The proportion of the total output of coke-oven gas contributed by the public utility group was therefore only 4.1 per cent in 1926, as against 4.7 per cent in 1918.

TABLE 91.—*Summary of operations of by-product plants owned by city gas companies and of all other by-product coke plants, 1918–1926*

[The plants owned by city gas companies are included by the Bureau of the Census in the manufactured-gas industry]

Year	Plants not owned by city gas companies					Plants owned by city gas companies (public utilities)				
		Coke produced		Surplus gas [1]			Coke produced		Surplus gas [1]	
	Number of plants	Net tons	Per cent of total by-product coke	M cubic feet	Per cent of total surplus gas	Number of plants	Net tons	Per cent of total by-product coke	M cubic feet	Per cent of total surplus gas
1918	51	24,919,395	95.9	150,908,288	95.3	9	1,078,185	4.1	7,450,191	4.7
1919	56	23,894,658	95.1	183,468,750	95.1	9	1,242,963	4.9	9,355,344	4.9
1920	59	29,637,341	96.1	221,032,497	95.9	9	1,196,610	3.9	9,383,422	4.1
1921	60	19,045,898	96.4	148,166,088	96.0	7	703,682	3.6	6,134,910	4.0
1922	57	27,889,475	97.7	226,152,451	97.7	7	661,070	2.3	5,230,567	2.3
1923	58	36,637,455	97.4	310,789,918	97.6	7	960,209	2.6	7,652,336	2.4
1924	60	33,072,640	97.3	292,368,617	97.1	11	910,928	2.7	8,835,236	2.9
1925	61	38,786,990	97.2	350,178,112	96.7	13	1,125,169	2.8	12,076,160	3.3
1926	62	42,894,780	96.7	381,477,264	95.9	15	1,481,806	3.3	16,436,824	4.1

[1] Surplus gas sold or used for purposes other than heating coke ovens, exclusive of a small amount wasted.